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# THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION

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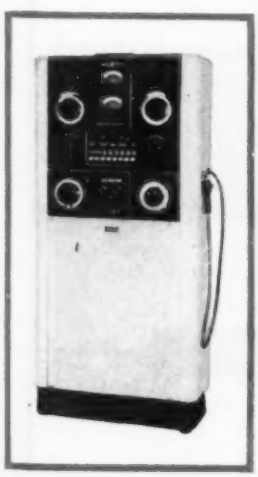

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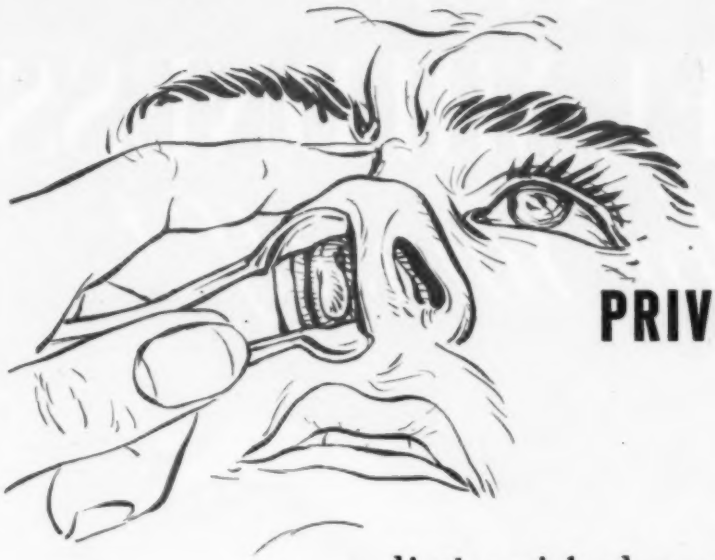

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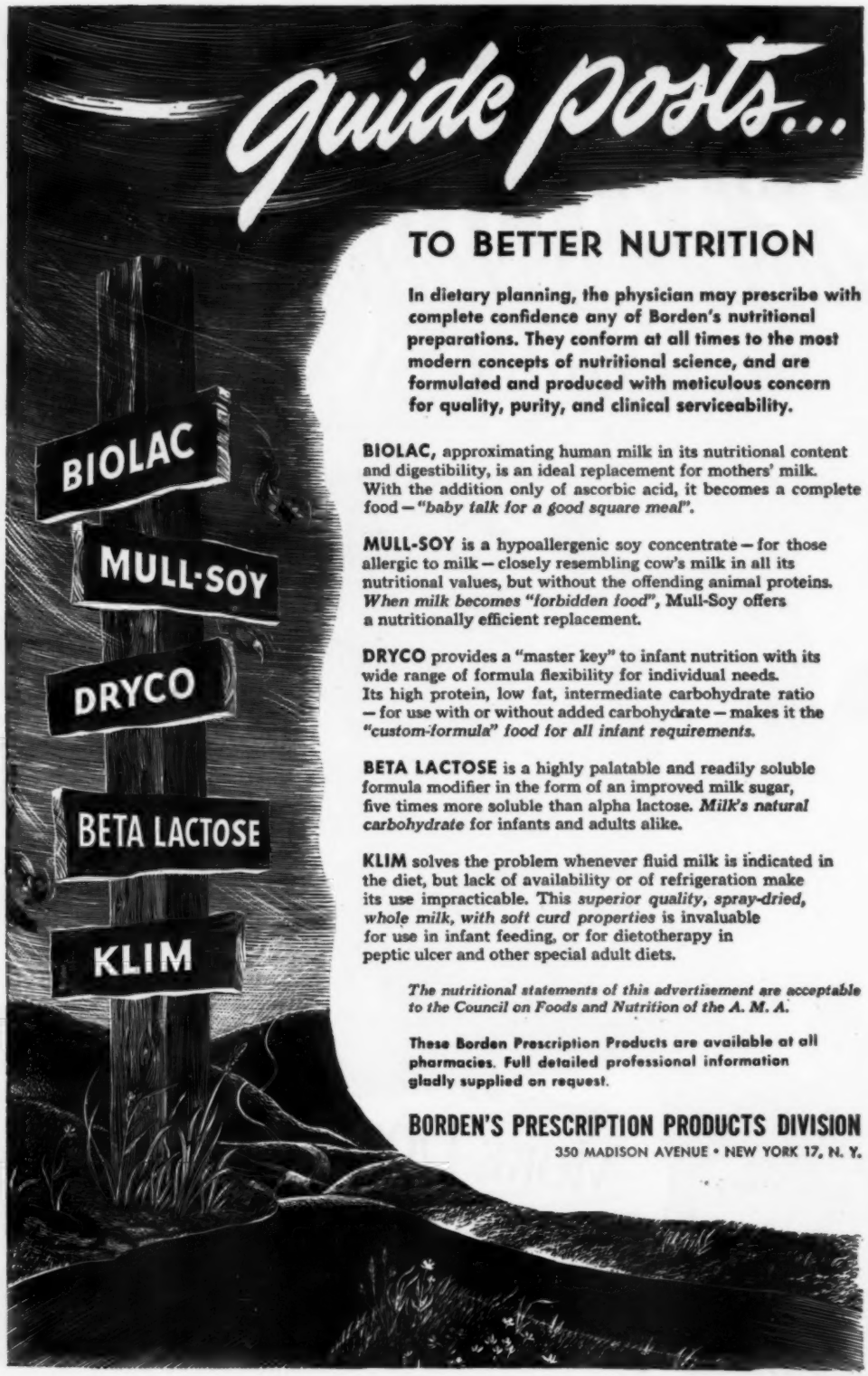


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**KLIM** solves the problem whenever fluid milk is indicated in the diet, but lack of availability or of refrigeration make its use impracticable. This *superior quality, spray-dried, whole milk, with soft curd properties* is invaluable for use in infant feeding, or for dietotherapy in peptic ulcer and other special adult diets.

*The nutritional statements of this advertisement are acceptable to the Council on Foods and Nutrition of the A. M. A.*

**These Borden Prescription Products are available at all pharmacies. Full detailed professional information gladly supplied on request.**

**BORDEN'S PRESCRIPTION PRODUCTS DIVISION**

350 MADISON AVENUE • NEW YORK 17, N. Y.

Time-Tested Principle

brought up-to-date

*Minit-Rub acts to relieve pain by one of the oldest principles in therapeutics—that of counter-irritation.* But Minit-Rub is a *modern* counterirritant—your patients will appreciate its clean simplicity.

*Minit-Rub combines oil of mustard, menthol, and camphor in a stainless, greaseless,* vanishing *base —it will not stain or harm fine fabrics.*

Through its pronounced analgesic action, Minit-Rub relieves the discomfort of aching chest muscles in uncomplicated chest colds—its clean invigorating odor relieves the feeling of nasal congestion.

*By direct rubefaction at the site of application, Minit-Rub tends to improve local circulation, relieve the painful symptoms of neuralgia, arthralgia, muscular aches and pains.*

*Product of* BRISTOL-MYERS
19 West 50 Street, New York 20, N.Y.

Minit-Rub is prompt in acting, a pleasure to use. It produces a delightful cooling sensation on the skin surface, a sense of soothing warmth in the affected areas. Just massage it on briskly.

relief begins in a matter of minutes

"THIS PRODUCT MAY BE OBTAINED *ONLY* THROUGH YOUR DOCTOR"

## JUST NINE LITTLE WORDS

BUT, what a vast difference these nine little words, which appear on all of our labels, can make in your business, and ours. Here is the pattern—

*1—Direct shipments to you only.*

*2—Eliminations of all go-between commissions . . .*

*3—Permitting high quality at low prices . . .*

*4—Complete ethical protection for your practice . . .*

*5—Positive control of your cases, through . . .*

*6—The returning of your patients to your office . . .*

*7—Assuring there will be no substitutions, advising, or prescribing by others. No shopworn products . . .*

Please use the coupon below when requesting more information; prices, and testing samples.

**ETHICAL SPECIALTIES COMPANY**
**REMINGTON BUILDING**
**KALAMAZOO 11, MICHIGAN**

Kindly send testing sample, data and price list to

Dr..... No.....

City-State .....

# Lanteen JELLY with HEXYLRESORCINOL

## FOR MAXIMUM SPERMATOCIDAL EFFECTIVENESS

Lanteen Jelly is a combination of powerful spermatocidal agents, including hexylresorcinol, the most potently bactericidal and least toxic of the alkyl substituted resorcinols,[1] described by Goodman and Gilman as "an effective and harmless contraceptive."[2]

**Ethically promoted—advertised only to the medical profession.**

Physician's package will be sent upon request.

**RAPIDLY SPERMATOCIDAL.** In a comparison of virtually all available jellies, Becker and Gamble found that Lanteen, the only jelly tested containing hexylresorcinol, destroyed sperm in the shortest time interval recorded.[3]

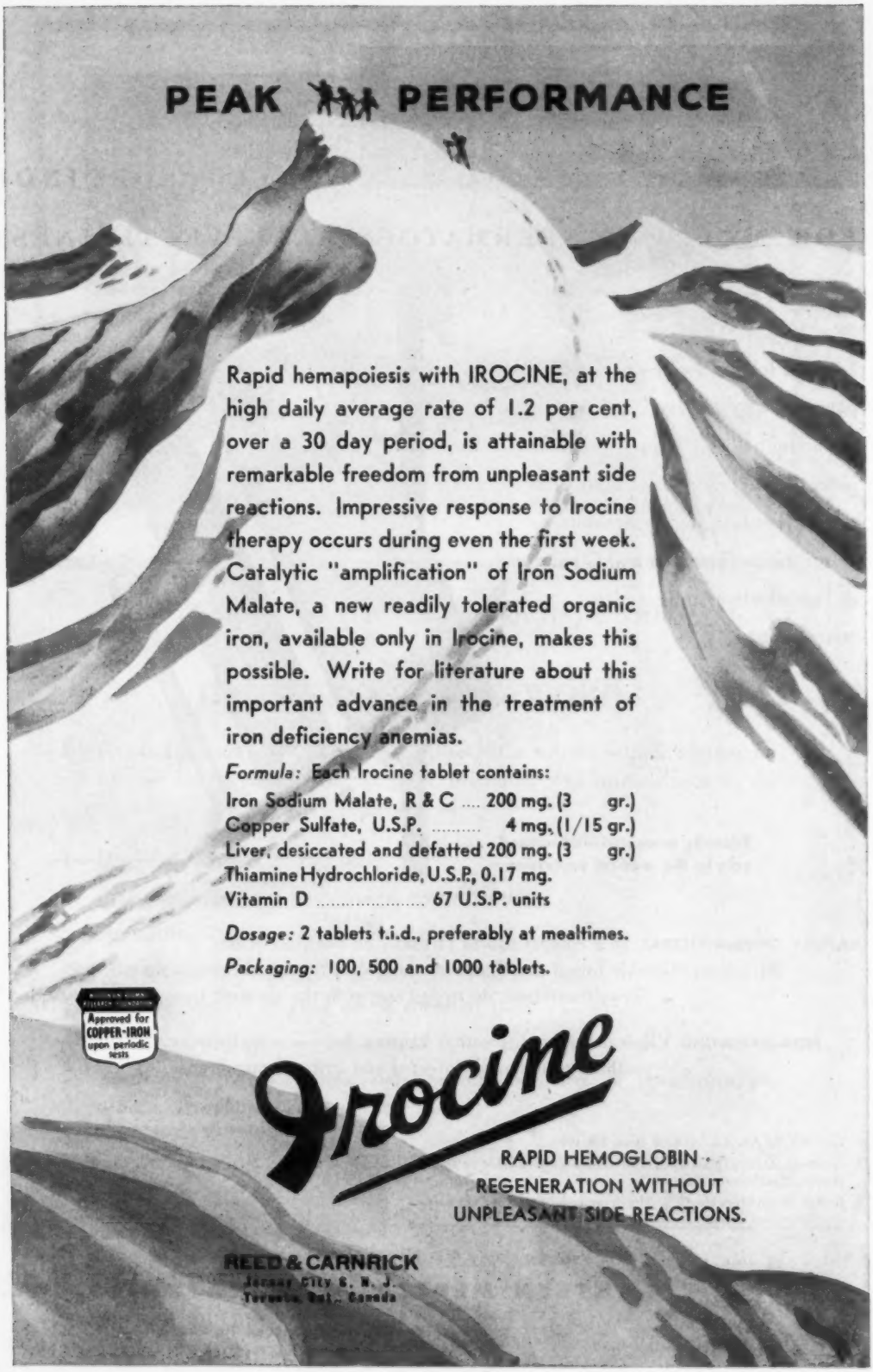
**NON-IRRITATING.** Clinical tests indicate that Lanteen Jelly is actually soothing to inflamed, infected and irritated membranes.

1. Leonard, V.: J.A.M.A. *83*:2005 (Dec. 20) 1924.
2. Goodman, L., and Gilman, A.: The Pharmacological Basis of Therapeutics, MacMillan, 1941, p. 675.
3. Becker, B., and Gamble, C. J.: The Spermicidal Times of Contraceptive Jellies and Creams, Human Fertility, *11*:111 (Dec.) 1946.

Lanteen

**LANTEEN MEDICAL LABORATORIES, INC.**

**900 N. Franklin Street, Chicago 10, Illinois**


PEAK PERFORMANCE
Rapid hemapoiesis with IROCINE, at the high daily average rate of 1.2 per cent, over a 30 day period, is attainable with remarkable freedom from unpleasant side reactions. Impressive response to Irocine therapy occurs during even the first week. Catalytic "amplification" of Iron Sodium Malate, a new readily tolerated organic iron, available only in Irocine, makes this possible. Write for literature about this important advance in the treatment of iron deficiency anemias.
Formula: Each Irocine tablet contains:
Iron Sodium Malate, R & C .... 200 mg. (3 gr.)
Copper Sulfate, U.S.P. ..... 4 mg. (1/15 gr.)
Liver, desiccated and defatted 200 mg. (3 gr.)
Thiamine Hydrochloride, U.S.P. 0.17 mg.
Vitamin D ..... 67 U.S.P. units
Dosage: 2 tablets t.i.d., preferably at mealtimes.
Packaging: 100, 500 and 1000 tablets.
Approved for COPPER-IRON upon periodic tests
Irocine
RAPID HEMOGLOBIN REGENERATION WITHOUT UNPLEASANT SIDE REACTIONS.
REED & CARNRICK
Jersey City 6, N. J.
Toronto, Ont., Canada

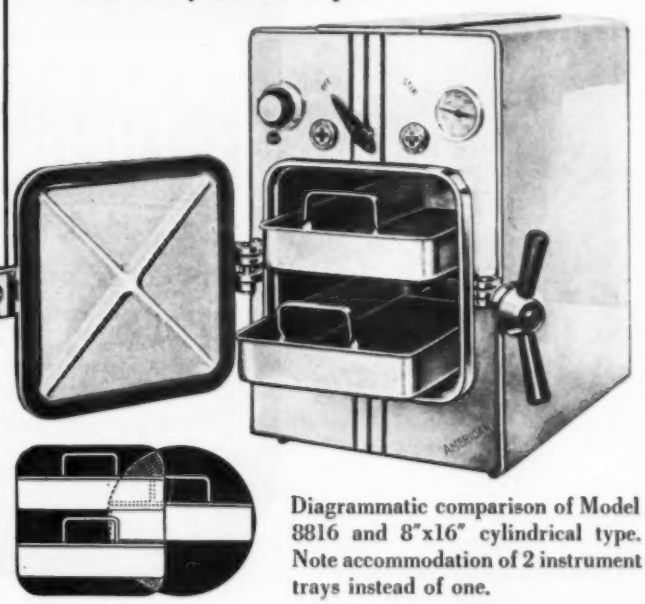
# Increases Load Capacity by 100%
## ...accommodates 2 instrument trays instead of one
# The "American"
# All-Purpose JUNIOR AUTOCLAVE
## (MODEL 8816)

- Fully automatic and self-compensating for all types of loads.
- Requires no valuable floor space. May be placed on any flat surface and operated from convenient electrical outlet.
- This all-purpose unit with 8"x8"x16" chamber will sterilize instruments, dressings, rubber gloves, solutions, antibiotics and all allied loads.

  The unit is automatically "burn-out-proof" and operates by one control lever which governs the complete functional cycle.

Presents a radical departure in autoclave design that meets every requirement wherever a single, pressure steam sterilizer of small size is indicated. Duplicates in every respect the efficient, precision performance of standard size "American" Surgical Supply Sterilizers widely used in hospitals.

SPACIOUS, DOUBLE-CABINET MODEL DB-16 is ideally constructed to accommodate MODEL 8816, thus combining the essentials of a practical Surgical Supply for the private office.



Diagrammatic comparison of Model 8816 and 8"x16" cylindrical type. Note accommodation of 2 instrument trays instead of one.

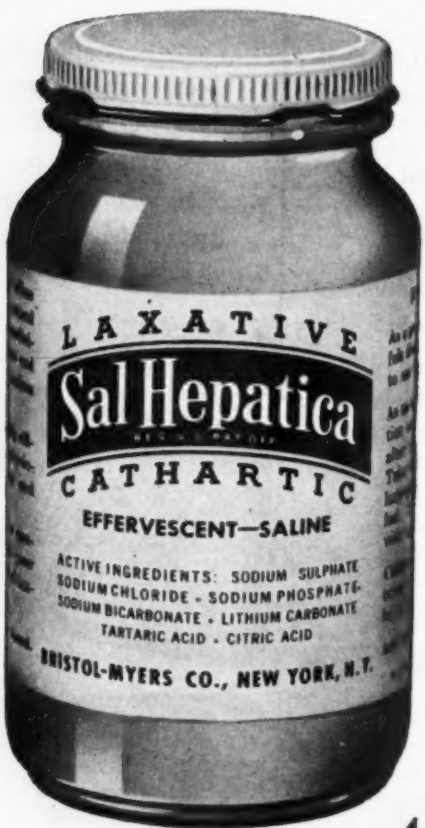
**Brings Hospital Sterilizing Efficiency to the PROFESSIONAL OFFICE LABORATORY • CLINIC**

*WRITE TODAY for complete information*

**AMERICAN STERILIZER COMPANY**

**Erie, Pennsylvania**

# Gentle
# Pleasant
# Prompt




A pleasant, effervescent saline laxative which acts by osmosis to produce soft fluid bulk . . . stimulates peristalsis . . . promotes prompt but gentle evacuation.

*Aperient**

*Laxative**

*Cathartic**

*Product of* BRISTOL-MYERS • 19 West 50th Street, New York 20, N. Y.

**Average dose*

# Facts About Conception Control

Clinicians generally favor the use of an occlusive device supplemented by a sperm-immobilizing agent for optimum protection. However, authoritative studies have established that a high degree of protection is afforded by use of a jelly alone—provided that the jelly has rapid spermatocidal action together with adhesive and cohesive properties sufficient to provide a dependable barrier.

When dependence must be placed on the "jelly alone" method, there is no better product available than "RAMSES"* Vaginal Jelly† because:

1. It provides rapid spermatocidal action.

2. It possesses dependable adhesive and cohesive properties—will not melt or run at body temperatures.

3. Direct-color photographs show that it will occlude the cervix for ten hours.

"RAMSES" Vaginal Jelly is available in regular and large-size tubes through all pharmacies.

ACCEPTED COUNCIL ON PHARMACY AND CHEMISTRY AMERICAN MEDICAL ASSOCIATION

†Active ingredients: Dodecaethyleneglycol Monolaurate 5%; Boric Acid 1%; Alcohol 5%.

Ramses TRADE MARK OF DEPENDABILITY

*The word "RAMSES" is a registered trademark of Julius Schmid, Inc.

gynecological division

Julius Schmid, Inc.

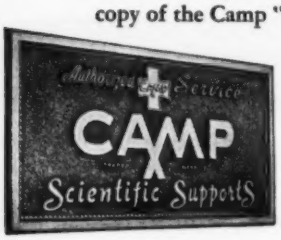
423 West 55th Street, New York 19, N. Y.

quality first since 1883

*Consistent Research Makes Scientific Design Basic In*

# CAMP SCIENTIFIC SUPPORTS

**For many decades it has been our privilege to work closely with physicians and surgeons in the design, improvement and manufacture of anatomical supports to meet the needs of their patients. The unique Camp adjustment feature insures proper firmness about the pelvis and controlled support of the abdomen, spinal column and gluteal region without compression. Write for your copy of the Camp "Reference Book for Physicians and Surgeons."**

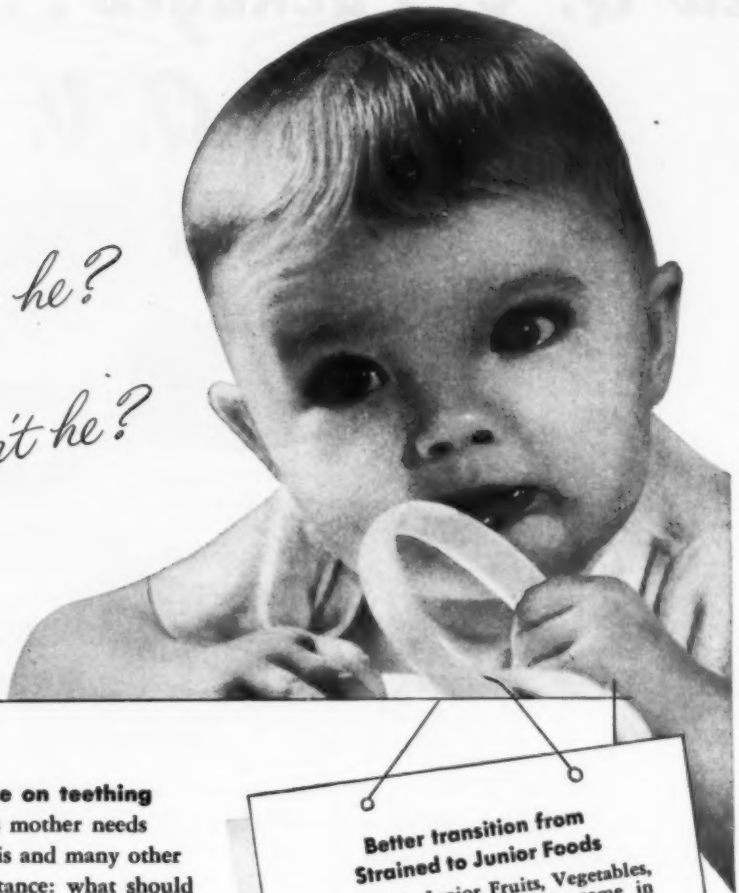



***THIS EMBLEM** is displayed only by reliable merchants in your community. Camp Scientific Supports are never sold by door-to-door canvassers. Prices are based on intrinsic value. Regular technical and ethical training of CAMP fitters insures precise and conscientious attention to your recommendations.*

**S. H. CAMP and COMPANY, Jackson, Michigan**
*World's Largest Manufacturers of Scientific Supports*
Offices in New York • Chicago • Windsor, Ontario • London, England

☐ Should he?

☐ Shouldn't he?



**How do you vote on teething rings?** A teether's mother needs your answer to this and many other questions. For instance: what should a baby with a few teeth eat? Gerber's Junior Foods, uniformly chopped, make chewing easier.

**Added plus:** babies like the naturally good taste of Gerber's—including the **NEW GERBER MEATS!** They're Armour quality Beef, Veal, Liver. Junior and Strained.

**Better transition from Strained to Junior Foods**

**1.** Gerber's Junior Fruits, Vegetables, Combinations and Desserts come in the same size container as Strained. So baby can have *more* variety with *less leftovers.*

**2.** Gerber's New Meats (Strained and Junior) come in one size container, too. Make change-over easier. Cost less than home-prepared meats.

**FREE!** Samples of Gerber's Junior Foods plus meat analyses cards. Write to Dept. 372-9, Fremont, Mich.

Babies are our business... our only business!

Gerber's
BABY FOODS
Fremont, Mich.—Oakland, Calif.

3 CEREALS · 23 STRAINED FOODS · 18 JUNIOR FOODS

# New Q. V. Packages . . .

# Same Q. V. Formulas

The same dependable, ethical products—VITAMINS—NUTRITIONAL SPECIALTIES so successfully used for many years . . . *but completely re-designed packages to give a more ethical appearance and quick identity.*

**Our long established "years tested" reputation for QUALITY products and new additions to our professional personnel assure you of a SUPERIOR line at lowest prices consistent with QUALITY.**

**We shall continue to give the very best service possible.**

***Our List Includes:***

**VITAMIN TABLETS AND CAPSULES**

Single and multiple, in various combinations, including essential minerals.

DICALCIUM PHOSPHATE, CALCIUM GLUCONATE and VIOSTEROL (Compressed Tablet).

FOLIC ACID

FOLIC ACID and IRON

MULTI-VITAMINS with FOLIC ACID

RUTIN

RUTIN and ASCORBIC ACID

TOCOPHEROLS (Vitamin E)

WHEAT GERM OIL

**NUTRITIONAL SPECIALTIES**

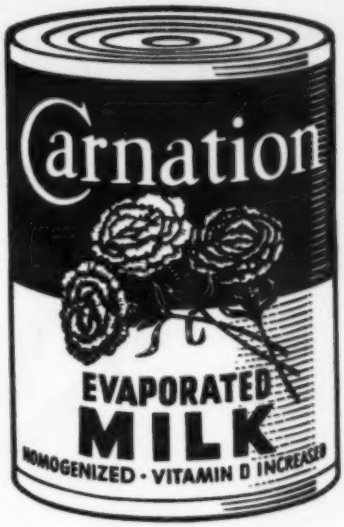
QUAMINOS (Protein Hydrolysate Q-V)

BULK-LAX

**Write for Complete Information and Price List**

## The Q-V Corporation

**REMINGTON BUILDING** **KALAMAZOO 11, MICHIGAN**




# Which would you prescribe for Infant Feeding?

**NATURALLY,** you'd choose a name you know . . . a name worthy of your confidence.

**AND CARNATION** *protects* your recommendation with the most scrupulous standards of safety, uniformity and nutritional value.

**EVERY DROP** of Carnation Milk is processed with "*prescription accuracy*" —in Carnation's *own* plants under Carnation's *own* continuous supervision. That is why you can have complete confidence in Carnation. It is evaporated, homogenized, enriched in vitamin D, and sterilized, under the most rigid controls. Constant tests and vigilant inspection are your guarantee that every can bearing the name Carnation meets the highest requirements of the medical profession.

**NO WONDER** nation-wide surveys show *more babies are fed on Carnation than on any other brand of evaporated milk.* It's the milk you can confidently *prescribe by name*—day in and year out.

*Nation-wide surveys show that Carnation Milk is more widely used in infant feeding than any other brand of evaporated milk.*

**The Milk Every Doctor Knows**

*"From Contented Cows"*

Vigilance
Constant vigilance, Doctor, is the price you must pay for high standing in your profession. You must keep alert to avoid slighting or neglecting the smallest essential detail in the conduct of your practice.
So it is with outstanding business institutions in general and with Vitaminerals in particular. Here, vigilance is constantly practiced to safeguard the highest possible quality in product, and to insure the most modern and painstaking research in the development of new supplementary aids to health.
Such vigilance is your assurance that Vitaminerals will play an important part in the vigilance that you, too, maintain.
PROFESSIONAL LITERATURE ON REQUEST
VITAMINERALS INC.
GLENDALE 1, CALIFORNIA

# MORE AND MORE....

## SAFE CONTRACEPTION

**Physicians prescribing KOROMEX Jelly and KOROMEX Cream where pregnancy is diagnosed as inadvisable, are recognizing the safe, non-irritating, effective qualities that are supported by a long clinical record . . . fastest spermatocidal time* . . . proper viscosity for cervical occlusion . . . the long time-period of stability . . . the effective use of spermatocidal agents in a non-irritating compound . . . the high ethical standards . . . pH consistent with the normal vagina.**

ACTIVE INGREDIENTS: BORIC ACID 2.0%, OXYQUINOLIN BENZOATE 0.02% AND PHENYLMERCURIC ACETATE 0.02%, IN SUITABLE JELLY OR CREAM BASES.

*MEASURABLE UNDER THE BROWN AND GAMBLE TECHNIQUE.

HOLLAND-RANTOS COMPANY, INC., 145 HUDSON STREET, NEW YORK 13, N. Y.

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*New (25th) Edition*

# GRAY'S ANATOMY
## of the Human Body

By HENRY GRAY, F.R.S.

*Thoroughly Revised and Edited by* CHARLES MAYO GOSS, M.D.
Managing Editor of *The Anatomical Record;* Professor and Head of the Department of Anatomy, Louisiana State University, New Orleans

GRAY'S Anatomy of the Human Body—the greatest of all textbooks on the subject—is now available in a *new (25th) edition.* The text has been enlarged and thoroughly revised throughout and many illustrations have been replaced or added wherever research in the expanding science of anatomy has offered new material or new points of view.

Changes have been made which increase the value of the book as a practical working tool for students and teachers of anatomy, including references at the ends of chapters which are much more extensive than in previous editions.

In editing this classic work, Dr. Goss has made extensive changes in the section on muscles and fasciae and to a lesser extent in many other portions of the book. Although the arrangement of the muscles in regional sequence has been retained, the action and nerve supply are given separately for each muscle instead of immediately following the descriptions of the muscles.

*New (25th) Edition. 1478 Pages. 1263 Illustrations, Mostly in Color. $14.00.*

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**Caminoids***
TRADEMARK
BRAND OF AMINOPEPTODRATE
*For Oral Administration*

**HIGH** biological value—Contains all of the recognized essential amino acids . . . derived from extracted liver and beef muscle, wheat gluten, soya, yeast, casein, and lactalbumin. One tablespoonful t.i.d. provides 12 Gm. protein as hydrolysate.

**WIDE** patient-acceptance—Notable palatability and adaptability to a variety of vehicles assure adherence to prescribed regimen.

ACCEPTED COUNCIL ON PHARMACY AND CHEMISTRY AMERICAN MEDICAL ASSOCIATION

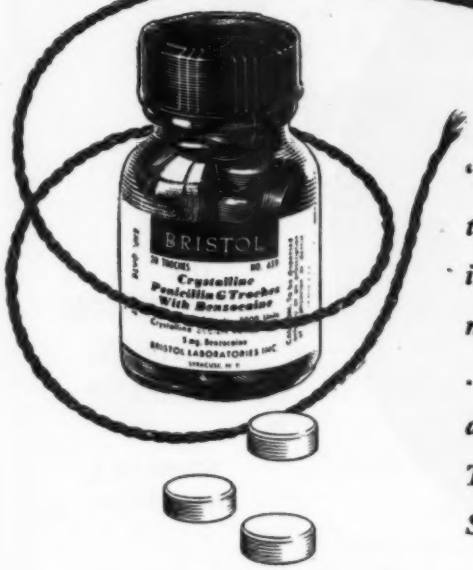
**Supplied: Bottles containing 6 oz.; 1-lb., 5-lb., and 10-lb. containers.**

*New designation of Aminoids adopted as a condition of acceptance by the Council on Pharmacy and Chemistry of the American Medical Association. The word Caminoids is an exclusive trademark of The Arlington Chemical Company.

Arlington

**THE ARLINGTON CHEMICAL COMPANY • YONKERS 1, NEW YORK**

# A STITCH IN TIME




*". . . . The prophylactic use of penicillin tends to reduce postoperative inflammation of the oral mucous membrane and the incidence of infection . . . There is less postoperative pain and healing is more rapid." Faier, A.D.: The Prophylactic Use of Penicillin in Dental Surgery. Dental Digest, 153:336, July, 1947.*

For either prophylactic or therapeutic purposes, Bristol CRYSTALLINE PENICILLIN G TROCHES with Benzocaine provide an efficient means for controlling intraoral infections due to penicillin-sensitive organisms. Inserted into the buccal sulcus, the troche dissolves slowly, directly bathing all accessible mucous membranes with an effective and prolonged concentration of penicillin. In the presence of painful, inflammatory or traumatic mouth lesions, the local anesthetic effect of benzocaine will be found especially desirable.

Each pleasantly flavored troche contains 5000 units of Crystalline Potassium Penicillin G, and Benzocaine, 5 milligrams. They are available from your usual source of supply in bottles of 20.

*Bristol*

## Crystalline Penicillin G Troches

*with Benzocaine*

**Bristol**
LABORATORIES INC.
SYRACUSE, NEW YORK

# NEO-CULTOL*

for the treatment of constipation

*Natural Corrective*
*Non-Habit Forming*

L. acidophilus in refined mineral oil jelly, chocolate flavored — provides natural, physiologic approach to correction of stasis. Supplies lactobacilli, predominant flora of the normal intestine . . . gently lubricates. Restores normal function without griping, flatulence, diarrheic movements. Melting point adjusted to prevent leakage. Jars containing 6 oz.

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## X-RAY APPARATUS TO SUIT YOUR NEEDS

**MODERN EQUIPMENT AT LOWER COST**

**We specialize in X-Ray Apparatus Only**

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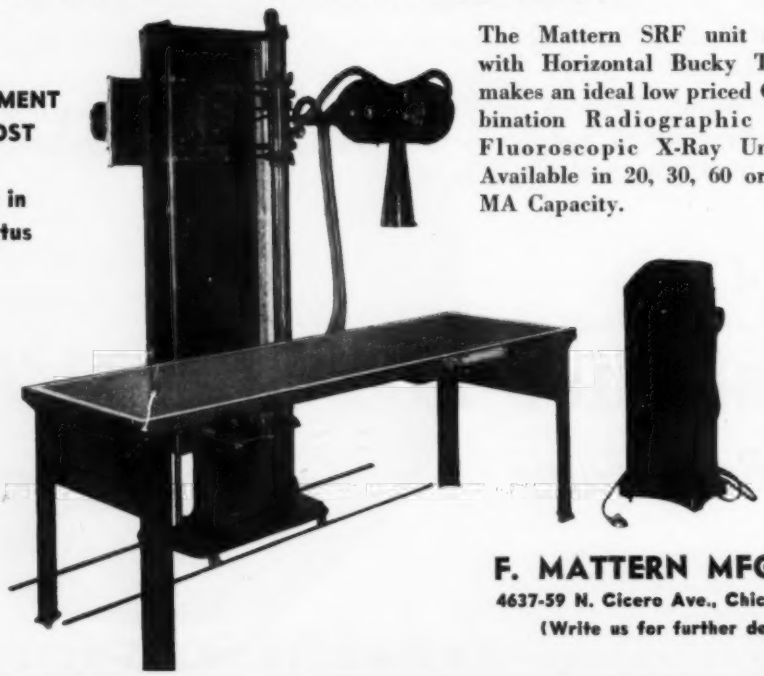

The Mattern SRF unit used with Horizontal Bucky Table makes an ideal low priced Combination Radiographic and Fluoroscopic X-Ray Unit — Available in 20, 30, 60 or 100 MA Capacity.

**F. MATTERN MFG. CO.**

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## Doubly Important in Convalescence

BREAKFAST skimping has no place in convalescence, since a poor morning meal may impose an impossible task on the other two meals in providing the daily nutrient needs.

A good starting point in planning breakfast for the convalescent is a widely acclaimed basic breakfast pattern consisting of fruit or fruit juice, cereal, milk, bread and butter. Other suitable foods may be added to bring the caloric and nutrient contributions to the desirable one-fourth to one-third of the day's nutrient requirements.

This pattern breakfast is rarely contraindicated. It is exceptionally well balanced as evidenced by the table of nutrient composition, and may be varied almost endlessly to provide renewed taste appeal. The cereal serving, consisting of breakfast cereal,* milk, and sugar, is an important component of this meal.

*The presence of this seal indicates that all nutritional statements in this advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.*

**CEREAL INSTITUTE, INC.**

A RESEARCH AND EDUCATIONAL ENDEAVOR DEVOTED TO THE BETTERMENT OF NATIONAL NUTRITION

135 South La Salle Street • Chicago 3

| BASIC BREAKFAST | TOTALS supplied by Basic Breakfast | | AMOUNTS supplied by cereal serving |
|---|---|---|---|
| Orange juice, 4 fl. oz.; | CALORIES | 611 | 202 |
| Ready-to-eat or Hot Cereal, 1 oz.; | PROTEIN | 20.7 Gm. | 7.1 Gm. |
| Whole Milk, 4 fl. oz.; | CALCIUM | 0.465 Gm. | 0.156 Gm. |
| Sugar, 1 teaspoon; | PHOSPHORUS | 488 mg. | 206 mg. |
| Toast (enriched, white), 2 slices; | IRON | 3 mg. | 1.6 mg. |
| Butter, 5 Gm. (about 1 teaspoon); | VITAMIN A | 1074 I. U. | 193 I. U. |
| Whole Milk, 8 fl. oz. | THIAMINE | 0.52 mg. | 0.17 mg. |
| | RIBOFLAVIN | 0.87 mg. | 0.24 mg. |
| | NIACIN | 2.3 mg. | 1.4 mg. |
| | ASCORBIC ACID | 64.8 mg. | |

**Composite average of all breakfast cereals on dry weight basis.*

OTTAWA ARTHRITIS SANATORIUM
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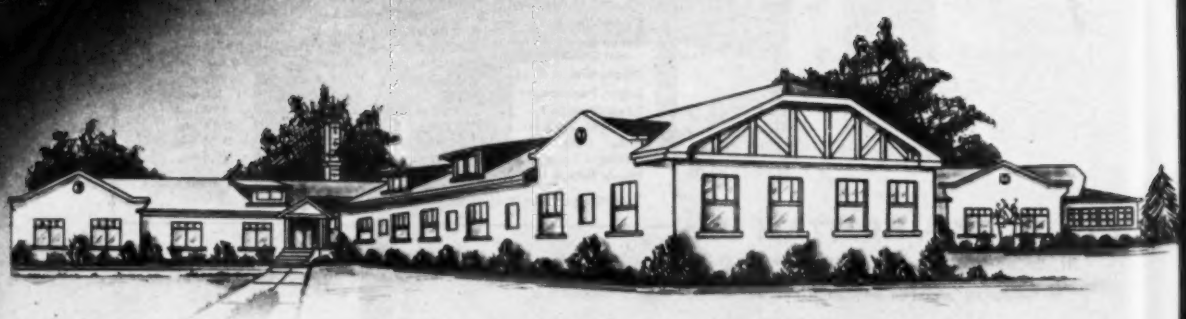

Arthritis Can Be Conquered

# in PSORIASIS

**The man or woman with psoriasis is shouldered with a great economic handicap. He or she finds it hard to get a good job because other workers are repelled by the unsightly patches.**

**Many a psoriatic patient is gainfully employed thanks to the doctor's prescription for RIASOL. In most cases conscientious treatment with RIASOL helps to remove the ugly patches, and in many cases it may reduce the likelihood of a recurrence.**

**RIASOL contains 0.45% mercury chemically combined with soaps, 0.5% phenol and 0.75% cresol in a washable, non-staining, odorless vehicle.**

**Apply daily after a mild soap bath and thorough drying. A thin, invisible, economical film suffices. No bandages necessary. After one week, adjust to patient's progress.**

**RIASOL is ethically promoted. Supplied in 4 and 8 fld. oz. bottles, at pharmacies or direct.**

**Mail coupon for your free clinical package. One trial will convince you of RIASOL'S value as an antipsoriatic.**

*Before Use of Riasol*

*After Use of Riasol*

MAIL COUPON TODAY
TEST RIASOL
YOURSELF

SHIELD LABORATORIES JAOA-2-4
12850 Mansfield Avenue, Detroit 27, Mich.

Please send me professional literature and generous clinical package of RIASOL.

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*Not just superficial massage, but actual springing of the spine.*

**PRECISION CONTROL**

**Under perfect control, the soft rubber rollers of the Spinalator gently and regularly manipulate every part of the spine.**

**The pressure, the area to be treated, and the timing is regulated to a fine degree.**

**The Spinalator is easily operated by an assistant, thereby saving the physician much time and energy.**

The Spinalator
REGISTERED U.S. PATENT OFFICE

*Write today for full particulars.*

**THE SPINALATOR COMPANY**

**P. O. Box 826** **Asheville, N. C.**

SEND FOR A PHYSICIAN'S SAMPLE OF OUR
PROTEIN DIGEST No. 26

Sidamine Tablets
or
Sidamine Granules

the amino acid tablet—uncoated—but carrying 70% protein,
no dextrose or other carbohydrate filler.

*In writing for samples, please give your degree*

Professional Foods

Cedar Rapids, Iowa

COLCIN PAN-ENZYMES NORMIN

*Send for Details on a Sound Reducing Regime and Plan*

**LIVER BILE THERAPY WON'T RESPOND . . .**

**In bile deficiency or fat indigestion Bile Therapy "works" fine provided a WHOLE BILE (like Schiff No. 3) is used and not just partly whole (Bile Salts).**

**In Cellular lesions—where bile, of course, is not at all useful the new therapy is with sulfur bearing protein fractions. Schiff No. 42 METHIONEX, derived from those fractions, is indicated in the treatment of alcoholic, toxic and fatty degeneration of the liver cells.**

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*PROFESSIONAL LITERATURE UPON REQUEST*

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## WOULD YOU BUY AN APPARATUS THAT MAKES ALL THESE FOOT THERAPY PROCEDURES POSSIBLE?

- Permits combining Low Volt with Aero-Hydro Therapy simultaneously.
- Gives ONE combined treatment in time formerly consumed by two.
- Makes possible CONTRAST BATHS — Ionic Therapy — Cleanses Wounds and Ulcers Aseptically, plus many other practical uses.
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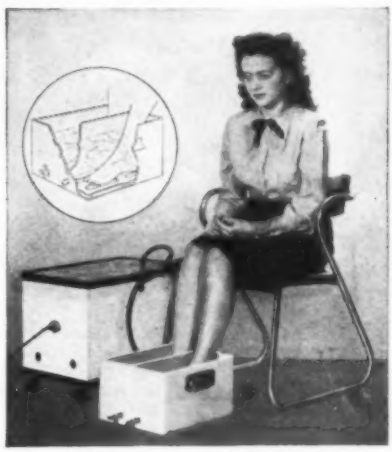

**The Schanne**

**Dual Purpose Aero-Hydro Electrode**
**For Low Volt or Hydro Therapy To—**
**Feet—Ankles—Hands—Wrists—and Arms**

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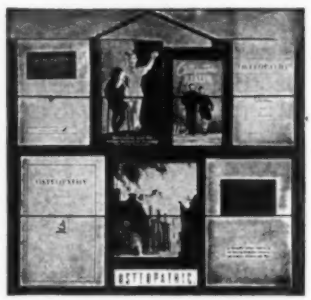

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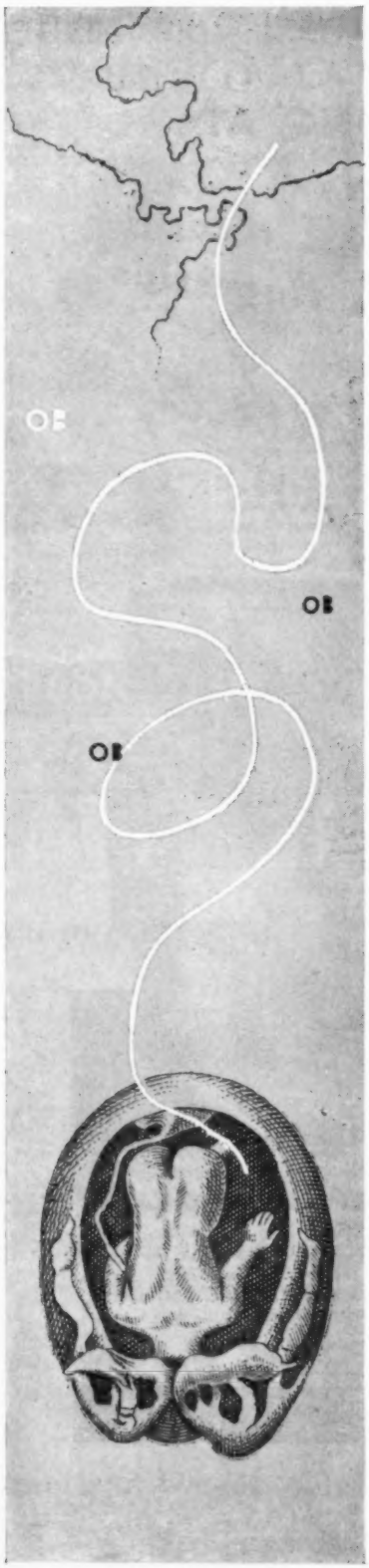


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## The Osteopathic Lesion Complex*

### V. The Effects of the Seventh Cervical Vertebral Lesion After Ninety-Six Hours, Six Weeks, and Six Months†


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Kirksville College of Osteopathy and Surgery
Kirksville, Mo.


#### INTRODUCTION

Previous reports[1,2,3,4,5] have indicated that there are tissue alterations and functional derangements following the production of experimental osteopathic vertebral lesions. In this report, which is one of a series in which the attempt is made to describe tissue alterations occurring as the result of an experimental osteopathic vertebral lesion, an endeavor will be made to describe histological variations observed in visceral structures in reflex connection to lesions produced at the level of the seventh cervical vertebra. The experiments reported in this paper were of durations of 96 hours, 6 weeks, and 6 months.

#### MATERIALS AND METHODS

Five experimental animals‡ were maintained for each of the intervals that the lesion existed, and three control animals were used with each group. The animals were unselected and were of approximately the same age and weight.

The osteopathic vertebral lesion was produced by the method of Burns.[6] This consisted of the application of pressure on the spinous process of the seventh cervical vertebra until rigidity of the paravertebral muscles was palpated. Care was taken during the lesioning process not to traumatize the tissues of the paravertebral region.

In all of the experiments the first lesioning procedure was done when the animal was 6 weeks old. It was not necessary to repeat the procedure more than three times to produce permanent rigidity in the paravertebral muscles. In no case did the paravertebral rigidity disappear after it had been present several days. The area of rigidity was not confined solely to the seventh cervical segment, but extended superiorly and inferiorly several vertebral segments, and was bilateral.

At the end of 96 hours, 6 weeks, and 6 months, respectively, the animals were killed by ether anesthesia and autopsied, and the tissues fixed in 10 per cent formalin in 0.9 per cent sodium chloride.

The freezing method of sectioning was used and the sections were cut at 15 micra.[7] Thionin and gallocyanin were employed as the nuclear stains and phyloxin as the counter stain.[8] Motor end plate preparations were made by the teasing method and stained with gold chloride.[9]

The photomicrographs reproduced in this report were taken with polarized light using carbon arc illumination.[10]

#### EXPERIMENTAL RESULTS

A. *Physical Examination.*—

1. Control animals: No abnormal behavior was noted in any of the experiments.

2. Experimental animals

a. The 96-hour experiment: Immediately after the lesion was produced the temperature of the pinnae increased appreciably and the eyes protruded. No other physical signs were noted.

b. The 6-week experiment: Gross changes similar to those in the 96-hour experiment were noted following the lesioning process. Several days after the initial lesioning the pulse became erratic, but not to the extent that was observed in association with the experimental atlas lesion.[3] This observation was made by palpation of the thoracic cage directly over the heart. The paravertebral musculature was rigid shortly after the first lesioning process, and apparently these muscles were tender because the animal attempted to avoid palpation. These findings were present until the animals were killed.

c. The 6-month experiment: The observations were essentially the same as in the 6-week experiment. No other physical signs were noted.

B. *Autopsy Examination.*—

1. Experimental animals

a. The 96-hour experiment: The paravertebral muscles were red and hyperemic on removal. The redness was not confined to the lesioned segment but extended bilaterally cephalic and caudal to the lesioned


*This report is made possible by a grant from the Committee on Research of the American Osteopathic Association.


†This is the fifth in a series of reports on "The Osteopathic Lesion Complex." Three parts were published in the November, 1947, April, 1948, and September, 1948, issues of THE JOURNAL. A fourth part was published in the July, 1948, *Journal of Osteopathy*.

‡It is realized that this number of animals is too small for a statistical analysis, but results have been consistent and it is believed that such an analysis is unnecessary.

Fig. 1

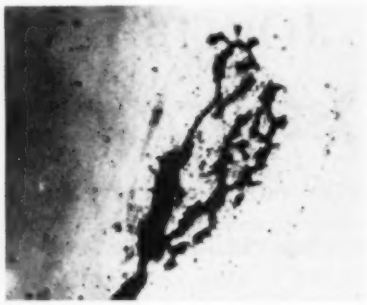


Fig. 2

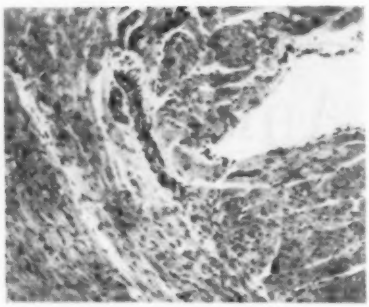


Fig. 3

Fig. 1. Motor end plates, ×160, in the paravertebral muscles of the cervicothoracic region, gold chloride stain. Heavy staining of the motor end plates and increased granularity of the motor end plate and the muscle fibers. The histological characteristics of the muscles are not seen in this section. (Seventh cervical lesion in existence for 6 weeks.) Fig. 2. Motor end plate in the paravertebral muscle of the cervicothoracic junction, ×500 enlarged, gold chloride stain. Enlargement indicates the loss of Kühne's granules characteristic of the plate located in resting muscle fibers. (Seventh cervical lesion of 6 weeks duration.) Fig. 3. Cardiac muscle, ×160, gallocyanin and eosin, control. Ventricle lined with endothelium located at upper right. Normal blood vessel is located at the base of the ventricle. Both longitudinal and cross sections of muscle fibers may be observed.

segment. No gross changes were observed in the viscera.

b. The 6-week experiment: Similar alterations were noted in the paravertebral musculature. No gross visceral alterations were observed.

c. The 6-month experiment: Alterations in the paravertebral musculature were observed similar to those noted in the 96-hour and 6-week experiments.

The external surface of the female reproductive organs exhibited an extreme degree of congestion. This was not evident in the male reproductive organs. No other viscera exhibited similar changes.

C. *Histological Examination.*—

1. Striated muscle

a. Control animals: The muscle fibers did not exhibit variations from the average. The nuclei were clear-staining and the chromatic pattern of the nuclei could be seen. The edges of the muscle fibers were straight and parallel.

b. Experimental animals: As there were no differences in microscopic characteristics in the three experiments, they will be described together. The nuclei stained well and the chromatic patterns could be seen. The edges of the muscle fibers were parallel but were not straight. The capillaries between the muscle fibers were somewhat dilated and extremely congested. In some cases it appeared that the blood had become sludged,§ and there were small areas in which red blood cells were observed between the muscle fibers. These were more prevalent in the 6-month than in the 96-hour experiment. The motor end plates in these muscles exhibited the same alterations previously reported[5] (Figs. 1 and 2).‖

2. Cardiac muscle

a. Control animals: No deviations from the normal histological structure were observed. The muscle fibers stained evenly and the capillaries between the muscle fibers were not congested and contained a normal amount of noncoagulated blood (Figs. 3 and 4).

§In a recent report on sludged blood Knisley and others[11] described vascular changes and circulatory disturbances which would seem similar to the changes described here. These investigators stated that the factors of normal blood flow, vessel walls, and the state of the vasculature are most important for the nomal function of viscera. These observations were made on living subjects, while this report is based on prepared sections. However, there seems to be a similarity in observations from the two experiments.

‖The magnification data given in the legends (Figs. 1 to 21) pertain to photomicrographs approximately 3 by 4 inches. This fact should be taken into consideration when studying the illustrations.

Fig. 4. Cardiac muscle, ×460 enlarged, gallocyanin and eosin. Enlargement of Figure 3 exhibits the detail of the nuclei of the muscle fibers and the longitudinal striations can be seen in the sarcoplasm of the fiber. A blood vessel is located at the lower left of the section with the endothelial cells staining heavily. Fig. 5. Cardiac muscle, ×160, gallocyanin and eosin. Three blood vessels in upper portion of the section. The vessel at the right is filled with blood cells and appears to be congested, the middle vessel contains a partial thrombus, while the one at the left is normal. The staining and morphological characteristics of the cardiac muscle fibers appear to be normal. (Seventh cervical lesion in existence for 96 hours.) Fig. 6. Cardiac muscle, ×460 enlarged, gallocyanin and eosin. Nuclei of the muscle fibers exhibit hyperchromicity. Blood vessel at the middle right seems congested with little perivascular extravasation. (Seventh cervical lesion in existence for 96 hours.)

Fig. 4

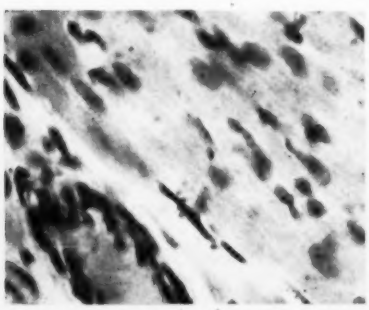


Fig. 5

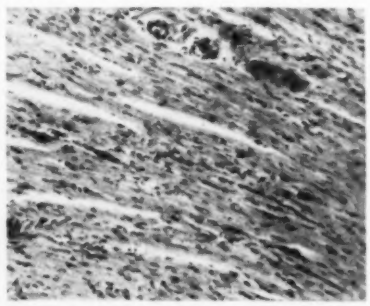
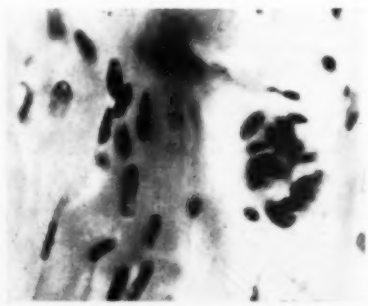


Fig. 6



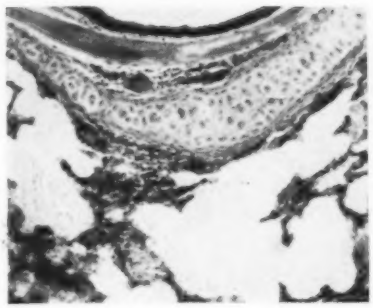


Fig. 7

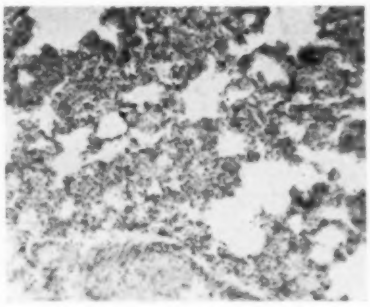


Fig. 8

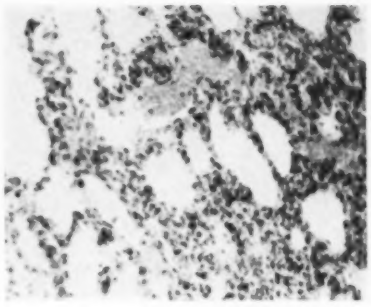


Fig. 9

Fig. 7. Lung, ×160, gallocyanin and phyloxin, control. Large bronchus at upper portion of the section. Mucous membrane is normal. Dark staining nuclei in the alveolar sacs are erythrocytes. Fig. 8. Lung, ×160, gallocyanin and phyloxin. Alveolar sacs exhibit a thickened wall. Blood vessel at lower center is congested. (Seventh cervical lesion in existence 6 weeks.) Fig. 9. Lung, ×160, gallocyanin and phyloxin. Alveolar sacs exhibit thickening and blood vessel in upper center shows congestion. (Seventh cervical lesion in existence for 6 months.)

b. Experimental animals

(1) The 96-hour experiment: Few histological alterations were noted. The nuclei were normal in size, shape, and staining reaction. Some sections exhibited scattered erythrocytes between the cardiac muscle fibers but there were no large accumulations. The capillary walls appeared normal (Fig. 5).

(2) The 6-week experiment: The walls of the capillaries were slightly thickened and congested; many of the smaller vessels showed the presence of thrombi. There were many small accumulations of blood cells between the muscle fibers. No degeneration of the muscle fibers was noted; the nuclei stained well, but some were hyperchromic (Fig. 6).

(3) The 6-month experiment: There were many large accumulations of sludged blood in the capillaries and in most sections there were accumulations of erythrocytes between the cardiac muscle fibers. As in the previous experiments, no degenerations of muscle fibers were observed.

3. Lungs

a. Control animals: The lung sections showed a slight amount of erythrocytic infiltration which was attributed to the use of ether as the lethal agent (Fig. 7).

b. Experimental animals

(1) The 96-hour experiment: Some sections exhibited a moderate degree of erythrocytic infiltration as compared to the control. These blood cells were located between the cells of the alveolar sacs. The capillaries in some sections contained degenerated blood and in all sections the capillaries were dilated (Fig. 8).

(2) The 6-week experiment: The sections contained large accumulations of blood cells in the tissue spaces, many of which were degenerated. Dilatation of the small blood vessels and capillaries was moderate. There was also a slight degree of thickening of the walls of the alveolar sacs.

(3) The 6-month experiment: Some areas in these sections contained congested vessels, some of which contained erythrocytes to the point of congestion with associated perivascular cuffing. Many lymph nodules associated with the bronchioles were observed in these sections (Fig. 9).

4. Gastrointestinal tract

a. Control animals: There were no variations from the normal histological characteristics in any of the divisions of the gastrointestinal tract.

b. Experimental animals

(1) The 96-hour experiment: The only variations noted were in the fundus and pyloric portions of the stomach where dilatation of the blood vessels of the submucous layer and the capillaries of the rugae were observed. Sections of other divisions of the gastrointestinal tract could not be distinguished from the control animals.

Fig. 10. Duodenum, ×160, gallocyanin and phyloxin. Heavy staining reaction of the columnar cells at the right. Slight vasocongestion may be observed in the region between Brunner's glands and the columnar epithelium. Contraction bands may be seen in the longitudinal muscle layer. (Seventh cervical lesion in existence for 6 months.) Fig. 11. Jejunum, ×480, gallocyanin. Portion of the mucous membrane. Goblet cells are clearly demarcated. Erythrocytes can be observed between the columnar cells of the epithelium. (Seventh cervical lesion in existence for 6 months.) Fig. 12. Liver, ×460, gallocyanin and phyloxin, control. Normal characteristics. Homogeneous cytoplasm with round or oval nucleus. The nuclei all stain with the same density.

Fig. 10

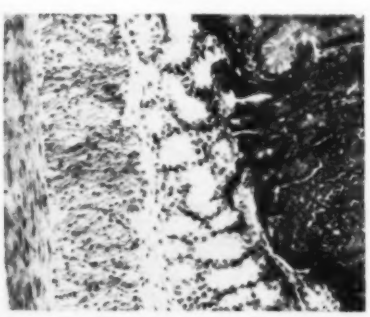
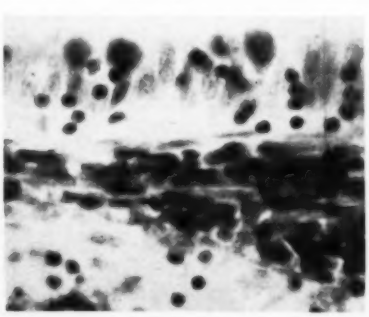


Fig. 11



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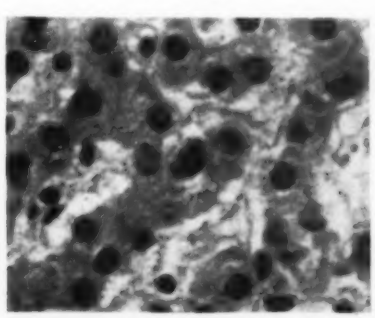


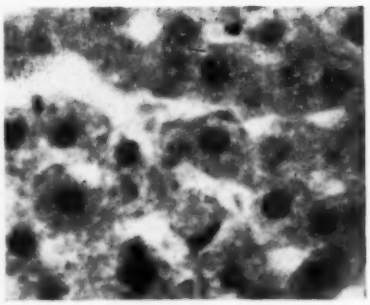


Fig. 13

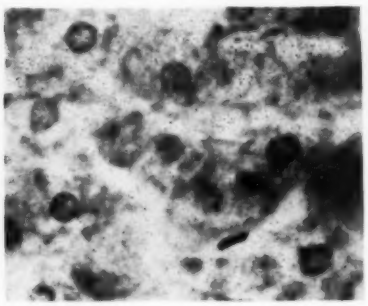


Fig. 14

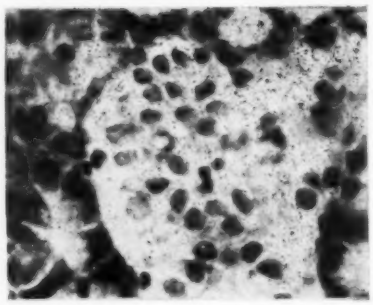


Fig. 15

Fig. 13. Liver, ×460, gallocyanin and phyloxin. Nucleus in some of the cells is eccentrically placed. The liver sinusoids are clear. The cytoplasm of some of the cells is granular when compared to the average. (Seventh cervical lesion in existence 96 hours.) Fig. 14. Liver, ×460, gallocyanin and phyloxin. Slight hyperchromicity of the nuclei but the nuclear pattern is normal. The sinusoids are narrowed due to a swelling of the cytoplasm of the cell. The cytoplasm shows evidence of fatty metamorphosis. (Seventh cervical lesion in existence for 6 weeks.) Fig. 15. Pancreas, ×460, enlarged, gallocyanin and phyloxin. Lighter staining area in center of section in island of Langerhans. Note the different staining reaction of the cellular elements. The solid dark round structures are erythrocytes. The only variation from the average is a slight increase in the interceilular erythrocytes. (Seventh cervical lesion in existence for 96 hours.)

(2) The 6-week experiment: Sections from the gastrointestinal tract, except the jejunum, ileum, and colon, exhibited vasodilatation; changes were most evident in the esophagus.

(3) The 6-month experiment: All portions of the gastrointestinal tract as far as the descending portion of the colon exhibited vasodilatation. In addition to this contraction bands were observed in the longitudinal smooth muscle layers (Figs. 10 and 11).

5. Liver

a. Control animals: Sections of the liver were stained evenly and the nuclei of the liver cells were clearly demonstrated. The capillaries contained normal amounts of blood and there were no erythrocytes seen between the liver cord cells (Fig. 12).

b. Experimental animals

(1) The 96-hour experiment: These sections contained areas of erythrocytes between the liver cord cells. The portal vein and hepatic artery were filled with erythrocytes and were slightly dilated. The nuclei of the liver cord cells stained well and a few of the cells exhibited an eosinophilic reaction (Fig. 13).

(2) The 6-week experiment: These sections contained areas in which sludged blood was observed. The portal vein and hepatic artery were congested. The liver cord cells were vacuolated and exhibited a degree of granularity.

(3) The 6-month experiment: Many red cells were observed between the liver cord cells, and the vasculature exhibited dilatation. The nuclei of the liver cord cells exhibited a chromophobic reaction and the cytoplasm was granular; in many cases the cells were swollen, presenting a histopathological picture of cloudy swelling. Some sections exhibited fatty metamorphosis (Fig. 14).

6. Pancreas

a. Control animals: There was no variation from the average histological picture noted in these sections. The blood vessels contained a normal amount of blood and the cells stained well and evenly.

2. Experimental animals

(1) The 96-hour experiment: There was a slight congestion of the blood vessels in some sections and there were erythrocytes between the cells of the islands of Langerhans. The pancreatic acini were normal and stained evenly and well.

(2) The 6-week experiment: The secreting acini of the pancreatic secretory elements stained evenly and were of equal size. Erythrocytes were observed between the cells of the secretory acini and between the cells of the islands of Langerhans (Fig. 15).

Fig. 16. Kidney, ×160, gallocyanin and phyloxin, control. Cortical portion. Section exhibits glomeruli, Bowman's capsule, capsular space between the glomerulus and Bowman's capsule and the convoluted segments of the duct system. Fig. 17. Kidney, ×160, gallocyanin and phyloxin. Normal except for dilated blood capillary at upper left of the section. The capsular space may be somewhat enlarged but this is not marked. (Seventh cervical lesion in existence for 96 hours.) Fig. 18. Kidney (glomerulus), ×460 enlarged, thionin. Blood cells (erythrocytes) in the glomerulus normal. Slight swelling of glomerulus and loss of capsular space. Nuclei of the collecting tubules do not exhibit variations. (Seventh cervical lesion in existence 6 weeks.)

Fig. 16

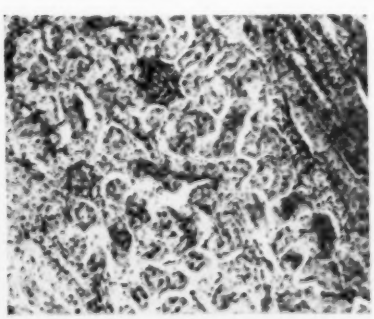


Fig. 17

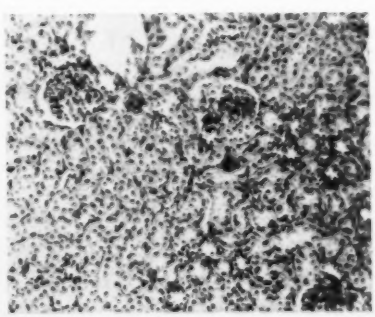
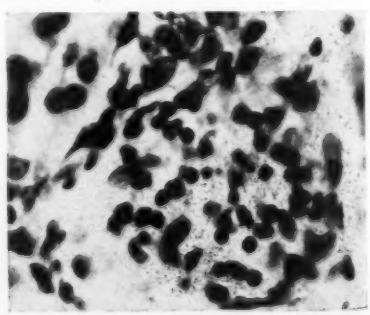


Fig. 18



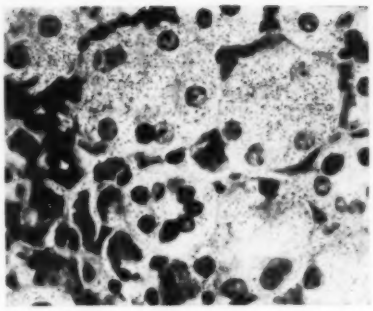


Fig. 19

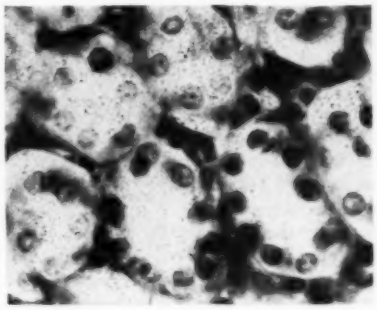


Fig. 20

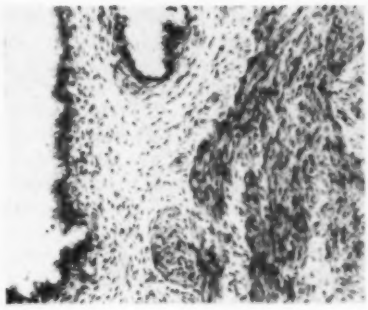


Fig. 21

Fig. 19. Kidney (medulla), ×440 enlarged, thionin. Cells appear normal. Small area of extravasation of erythrocytes in lower left. (Seventh cervical lesion in existence for 6 weeks.) Fig. 20. Kidney (medulla), ×460 enlarged, thionin. Note accumulations of erythrocytes between collecting tubules and indistinct staining characteristics of the cytoplasm of the cells. (Seventh cervical lesion in existence for 6 months.) Fig. 21. Urinary bladder, ×160 enlarged, thionin. Normal histological characteristics. (Seventh cervical lesion in existence for 6 months.)

(3) The 6-month experiment: There was a moderate extravasation of erythrocytes between the secretory cells in these sections. No other abnormalities were observed.

7. Kidneys

a. Control animals: The cells of the cortical and medullary region stained well and evenly. The glomeruli did not appear swollen and there was no congestion apparent in the blood vessels in these sections (Fig. 16).

b. Experimental animals

(1) The 96-hour experiment: Sections from the kidneys of these animals appeared normal except that several sections exhibited a slight degree of congestion in the blood vessels (Figs. 17 and 18).

(2) The 6-week experiment: There was evidence of increased vasocongestion in all of the sections. This was especially marked in the cortical region; the glomeruli were swollen and contained erythrocytes in excess of the amount observed in the controls. The medullary portion of the kidney exhibited normal histological characteristics (Fig. 19).

(3) The 6-month experiment: There was cloudy swelling in the cells of the collecting tubules and the glomeruli were swollen and filled Bowman's capsule. The medullary portion of the kidney exhibited a mild degree of parenchymatous degeneration (Fig. 20).

8. Uterus

a. Control animals: The mucous membrane lining the uterus and the myometrium appeared to be normal. There was no congestion noted in the vasculature in this experiment.

b. Experimental animals

(1) The 96-hour experiment: There were no histological variations in the tissues observed in this experiment.

(2) The 6-week and 6-month experiments: As the sections of both of these experiments presented the same histological picture they will be described together. The myometrium seemed normal but there was considerable congestion in the blood vessels. This was most apparent in the external portion of the muscular layers. The mucous membrane did not exhibit variations from the average.

Other organs examined were the urinary bladder (Fig. 21), the gallbladder, and the male reproductive system. There was a minor degree of congestion in sections prepared from these organs but it was not considered to be significant.

## DISCUSSION

It is probable that the variations observed in these experiments are related. If the reactions observed following the production of an experimental osteopathic lesion were wholly local, visceral changes would not be observed.[5] Since they were noted it would be expected that there was a common factor in their production. An explanation of these changes can probably be made on the basis of an automatic imbalance. It has been stated[12] that osteopathic manipulative therapeutics probably obtain their effects through the autonomic nervous system, and it is equally probable that osteopathic vertebral lesions also manifest themselves through a similar mechanism.[5]

It is probable that protrusion of the eyes and dilatation of the blood vessels of the pinnae were the direct results of the mechanical lesioning process; Fulton[13] has demonstrated that stimulation of the cervical sympathetic ganglia produces such a reaction. It is probable that the extreme contracture of the cervical muscles resulting from the osteopathic vertebral lesion produced sufficient irritation to the cervical sympathetic ganglia to cause the observed phenomena. This contracture persisted and, therefore, the irritation to the sympathetic ganglia continued, thus maintaining the physical alterations described.

Besides the contracture of the paravertebral muscle mass, noted by palpation and histological examination, there was considerable hyperemia of these tissues noted on autopsy examination indicating the presence of an autonomic imbalance. (This observation was similar to that noted in association with the experimental atlas lesion.)[5] The same explanation may be applied here, namely, that both contracture and hyperemia are parasympathetic responses and are transmitted from the site of irritation to centers in the brain stem by afferent spinal pathways.[14,15] When receptors in the muscle fibers are stimulated, their afferent fibers synapse with the cells of the mediolateral and anterior cell columns of the spinal cord; afferent impulses are then transmitted to the hypothalamus and thence to the dorsal nucleus of the vagus which when stimulated produces parasympathetic activity (vasodilatation) in the musculature. It is probable that such a mechanism is responsible for the alterations observed in this experiment.

The striated musculature associated segmentally with the lesioned area exhibited contracture on histological examination. It is possible that the lesioning process was primarily responsible for this variation as

the mechanical stress placed upon the segment was sufficient to activate such a defense mechanism, and a contracture would produce sufficient irritation through reflex activity to maintain itself. The principle of recurrent nerve circuits may be applied to this situation as an explanation.[16] This states that a nerve impulse initiated at any part in a reflex circuit can be self-perpetuating and may continue for a long time without further external stimulation. It then follows that irritation, either external or internal, may result in paravertebral contracture which may exist for some length of time without added irritation.

Vasodilatation was observed in cardiac muscle, and with such a change present it would be expected that there would be functional cardiac disturbances. It has been shown[17] that contracture of the paravertebral muscles of the lower cervical segments will produce dilatation of the coronary vessels due to the stimulation of the sympathetic portion of the autonomic nervous system. In the experimental animals with a vertebral lesion in existence for 96 hours there were no gross cardiac irregularities noted, nor were there any histological variations. When the contracture continued for 6 weeks or longer irregularities in cardiac action were apparent as well as histological changes. The change observed was chiefly congestion of the blood vessels which indicated an imbalance of the autonomic innervation of these vessels. Therefore, it was concluded that the irritation produced by the lesioning process and persistence of contracture of the paravertebral musculature resulted in disturbed activity of the autonomic innervation of the coronary blood vessels.

No variation in respiratory activity was noted in any of the experiments. The irritative reaction noted in the tissues of the lungs in the 96-hour experiment could not be attributed entirely to reflex activity as ether was used as the lethal agent and its action produces considerable irritation in respiratory tissues. In the 6-week and 6-month experiments similar irritative reactions were observed; it was thought that these could not be due to an irritation that had been present a short time previously but were produced by the irritation mediated by the autonomic system.

Vasodilatory fibers to the lungs are derived from both divisions of the autonomic nervous system and stimulation of either portion could result in a generalized vasodilatation. It is possible that stimulation was mediated by the dorsal nucleus of the vagus. On the other hand, the sympathetic pulmonary innervation is derived from the third to fifth thoracic segments and it is likely that the contracture of the paravertebral musculature irritated the highest branches. The sympathetic and parasympathetic fibers join to form the pulmonary plexus so that irritation to either of the divisions would produce a similar result in the vasculature of this organ.

As the heart and lungs are closely associated with the region of the experimental lesion anatomically and nervously, visceral alterations produced by the lesion would be expected. It is not probable that these alterations would be observed in viscera some distance from the site of the lesion unless the autonomic nervous system was involved. Histological examination of viscera of the abdominal and pelvic cavities showed variations in these organs, which would indicate that factors other than direct segmental stimulation were involved.

The sympathetic supply to the gastrointestinal tract is derived from the first to the twelfth thoracic segments and the function is mainly constriction of the vasculature and inhibition of the digestive process. The parasympathetic supply is derived from the vagus nerve and the function is opposed to that of the sympathetic, that is, its stimulation results in vasodilatation and increased digestive activity. Histological sections from various regions of the gastrointestinal tract in the 96-hour experiment indicated that there was vasodilatation in the esophagus and stomach only. In the 6-week and 6-month experiments vasodilatation was observed in the esophagus, stomach, small intestine, and as far as the descending colon. This indicated that the effects of the experimental lesion were dynamic and not static, because of this spread of reflex irritation. The presence of contraction bands in the longitudinal muscle layer was indicative of activity of the gastrointestinal tract,[18] and as these were observed in the same regions that exhibited vasodilatation they were considered to be evidence of vagal predominance.

The liver receives its sympathetic innervation, which exerts vasomotor control, from the fifth to the ninth thoracic segments via the celiac plexus. The parasympathetic supply is derived from the vagus nerve and it is thought that stimulation of this nerve produces vasodilatation.[19] The changes observed in the peripheral (active) zone of the liver lobule would indicate generalized activity, which is a parasympathetic response.[20] In the central portion of the liver lobule it was noted that there was an extreme degree of granularity in the liver cord cells, while in the middle region of the lobule, vacuolation of the liver cells was observed. This observation may be explained on the basis of parasympathetic predominance.

It should be mentioned that some of the liver dysfunction could have been due to viscerovisceral reflex originating in the stomach. Pottenger[21] has described such a mechanism by which functional disturbance of the stomach produces a similar disturbance in the liver.

The pancreas receives its parasympathetic supply from the vagus nerve. Stimulation of the vagus increases the secretion of the pancreatic acini. The sympathetic supply is derived from the fifth to the eleventh thoracic segments. Stimulation to these fibers decreases the pancreatic secretion. It has been stated[22] that stimulation of these nerves results in vasoconstriction in the parenchyma. It was reported by Deason[23] that osteopathic lesions exerted an influence on pancreatic activity. The results of the present experiment would substantiate that observation.

Sympathetic fibers to the kidney are derived from the seventh to the tenth thoracic segments, their function is vasoconstriction.[24] The parasympathetic nerves are derived from the vagus and their function is the opposite of that of the sympathetic innervation. Histological sections exhibited a degree of vasodilatation that was considered evidence of vagal activity. The absence of such vasodilatation in the 96-hour experiment would be an indication of the dynamic process of osteopathic lesion pathology, because such an alteration was seen in the 6-week and 6-month experiments.

The sympathetic innervation to the spleen is derived from the sixth to the eighth thoracic segments. Parasympathetic fibers are derived from the vagus nerve. Stimulation of the sympathetic component produces a generalized contraction of the organ, and stimulation of the parasympathetic supply apparently exerts no influence.[25] No conclusions could be made from the observations in this experiment as some sections seemed to exhibit vasodilatation and accumulation of erythrocytes in the splenic pulp, which was directly propor-

tional to the duration of the experiment, while others did not exhibit variations from the control.

The sympathetic supply to the uterus is derived from the lowest thoracic and the first two or three lumbar segments; the function is motor and vasoconstrictive.[26] The parasympathetic supply is derived from the sacral outflow; the function is vasodilative. The vasodilatation was apparent in all of the experimental animals, both grossly and histologically. It would be impossible to accept the explanation that the lesioning process in the low cervical region would produce these changes because of direct irritation. A more rational explanation is offered by the fact that reflex responses in the female genital organs may be elicited by impulses arising in adjacent viscera or by afferent stimulation of somatic nerves.[27] Some of these reflexes are mediated through the genital centers in the lower lumbar or sacral segments of the spinal cord; others involve centers in the brain stem, including the autonomic centers in the hypothalamus. It would be concluded that the reaction observed in the uterus is a parasympathetic response mediated through the spinal cord from the autonomic centers in the brain stem.

There was no evidence observed in this experiment to indicate the presence of a faulty anatomical vertebral articulation. This, as was previously stated,[5] is not necessary to explain the visceral alterations because a mechanism, neural in nature, apparently produced the alterations in the viscera seen in the histological sections. Both somatic and visceral afferent fibers stimulated by an experimental structural alteration carried impulses which affected a common pool of secondary neurons to which the principles of summation and inhibition are applicable.[28] The presence of the osteopathic vertebral lesion produced an irritation in a muscle group by virtue of reflex connections; the response to the irritative stimuli is a maintained contracture of the paravertebral muscles segmentally related. These in turn act as secondary irritants, calling forth further contracture as a response. Therefore, the contracture of the paravertebral musculature serves to maintain itself, producing summation in autonomic connections.[16,28]

The histological sections indicate that a vertebral osteopathic lesion in the region of the seventh cervical vertebra does influence the activity of the dorsal nucleus of the vagus. This probably occurs through visceral and somatic afferent fibers that enter the spinal cord by the dorsal roots and transmit impulses to the thalamus and hypothalamus by way of the afferent tracts in the spinal cord.[29,30] The hypothalamus has efferent connections with the dorsal nucleus of the vagus.[29] Thus, there is a direct reflex pathway which joins the spinal areas to the autonomic nuclei. It is important to note that all of the autonomic effects that can be produced by hypothalamic activity are also controlled by lower centers in the medulla and spinal cord. The distinctive importance of the hypothalamus is not in initiating autonomic activity but in the integration of these effects into patterns which adjust the internal environment of the organism to external stimuli.[31] In this manner minor variations in functional activity of a single part of an organ or tissue, in this case the skeletal muscle of vertebral segments, may affect the functional activity of organs distant from the original lesion because of mediatory action of the coordinating mechanism of the hypothalamus.

From this and previous experiments[1,3,5] it may be concluded that the effects of the osteopathic vertebral lesion are mediated by the autonomic nervous system. In the experiments involving the atlas and seventh cervical vertebra the parasympathetic division of the autonomic system predominated.

## CONCLUSIONS

From the evidence derived from this experiment the following conclusions were made:

1. The presence of such an experimental osteopathic vertebral lesion does not produce a static alteration but rather its presence instigates a reflex which influences organs by producing significant physiological dysfunctions that vary according to the location and duration of the lesion.

2. Because of the number of structures and the neural mechanisms involved, the entity should be regarded as the osteopathic lesion complex[32] rather than a localized limitation of motion of vertebral segments.

3. The evidence of this experiment would indicate that an osteopathic lesion in the region of seventh cervical vertebral segment produces an autonomic imbalance in which parasympathetic activity predominates.

4. The vertebral limitation of motion has the ability to maintain itself after it has become established. In this case the production of such a lesion was artificial; however, in animals such lesions occur accidentally and persist indefinitely.

5. The histopathological variations observed in this experiment could not be considered irreversible. The degree was sufficient to produce functional disturbances in the various viscera but from the evidence derived from this experiment these pathological processes would not be expected to become progressive pathological degenerations ending in the death of cells.

6. As in the previous report on the atlas lesion[5] there was no evidence to support the belief that there was a bony misalignment. On the contrary, it would be expected that the paravertebral contracture would produce the limitation of motion which characterized these vertebral lesions, resulting in an altered physiology of the vertebral segment rather than an anatomical alteration.

7. The contracture of the paravertebral muscles was bilateral; no conclusions could be made as to the degree of contracture on one side as compared to that on the other.

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# The Surgical Care of Gastric and Duodenal Ulcer at the Art Centre Hospital*

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The surgical management of gastric and duodenal ulcers depends, of course, upon the circumstances surrounding the individual case. The surgical treatment in a certain percentage of cases must necessarily be performed as an emergency and not in any way with a view to curing the ulcer or even preventing recurrence of ulceration in the vicinity.

An enormous amount of brilliant work has been done by such men as Billroth, Polya, Moynihan, Hofmeister, the Mayos, and many others, but the final story of gastric and duodenal ulcer treatment has not yet been told. The surgical treatment continues in a state of flux, largely because of the various unproved theories as to the etiological factors involved. Some surgeons are investigating the role of the vagus, for instance, as a causative factor, while others are modifying their technics to bring about a positive control over the hyperchlorhydria which is so obviously a contributing factor.

This paper is not of sufficient scope to review the various theories involved in the ulcer problem, nor will it deal with the various more or less standard operative procedures which are used every day by the many surgeons who do work on the upper intestinal tract. It will deal, rather, with the methods and procedures in use at this time in the Art Centre Hospital at Detroit.

The ulcer cases seen there may be sharply divided into three classifications: (a) the hemorrhaging cases; (b) the perforated (contaminated) cases, and (c) the chronic cases.

Generally speaking, the hemorrhaging case is not considered as surgical in nature. We follow Rivers'[1] opinion that the bleeding patient has a somewhat better chance of surviving if he is not submitted to operation. In the hemorrhaging patient, shock is always just around the corner. Surgical operation, added to the embarrassing blood depletion, may be more than the patient can stand. Efforts to re-establish the blood volume, such as blood transfusion, administration of plasma, etc., tend to increase the likelihood of further bleeding from the eroded vessel. The surgeon thus finds himself upon the "horns" of a dilemma. These dilemmas have been faced by many surgeons over a period of many years, and the experiences of these many men apparently have shown that the lesser error is on the side of conservatism.

Young and vigorous men seem to be more subject to hemorrhage than older men or women. The first hemorrhage is not likely to prove fatal. Repetitions of ulcer hemorrhage over periods of months or years are attended by danger to life, and, if the patient is not persuaded to undergo surgery for cure of the basic condition responsible for the recurring ulcerations, the surgeon might do well to improve his salesmanship. The hemorrhaging patient is a source of much worry. The surgeon recognizes the danger and he should realize that improper treatment may work to the patient's disadvantage.

A bleeding vessel is always a stiff-walled vessel because of the fibrotic changes in its coats, and it cannot retract properly. Before the patient's blood pressure has dropped, the force with which blood squirts from the eroded vessel is amazing. If it were not for the ebbing blood pressure, I daresay few hemorrhaging patients would survive. With the pressure diminished, the eroded vessel becomes occluded by a soft clot. The wise surgeon will respect that clot and will protect it with all the means at his disposal, in the hope that organization will follow.

The patient must be kept quiet. He must have nothing by mouth other than cracked ice in limited quantities. The transfusion of blood and the intravenous injection of plasma, glucose-saline solution, etc., should be postponed as long as is safely possible. The foot of the bed might well be raised. Quieting drugs are indicated.

I well realize there are cases which bleed so terrifyingly that the surgeon is unable to resist the urge to replace the blood loss by transfusions, frequently

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repeated, with the hope that the intake will approach a balance with the output. The administration of coagulants is not contraindicated although the benefits obtained thereby cannot be evaluated.

The great majority of hemorrhaging patients enter the hospital well past the period for safe surgical operation. If the surgeon could see the bleeding patient immediately and could foresee that in this particular case there would be dangerous bleeding, it would be a simple and safe matter to open the abdomen and resect the area of pathology, thereby not only stopping the hemorrhaging but also widely removing its site. Such opportunity is rare. We consider a hemoglobin level of 80 per cent as the lower limit of safety for upper abdominal surgery. The patient who has lost 2 quarts of blood cannot very well be made into a good surgical risk without the lapse of valuable time. Under the circumstances, we feel obliged to follow the policy of conservatism.

All contaminating perforations are considered surgical in nature and operation at the earliest possible moment is the method preferred in their management. The history and the picture of a leaking perforation are quite typical and diagnosis, in the majority of cases, is not difficult or delayed. The board-like rigidity of the right abdomen, the respiratory distress, and the anxiety of the patient denote a dire need for surgical intervention. Although the pain accompanying a perforation is a brutal thing, its severity is often an advantage to the patient. He makes no resistance when the physician orders him into the hospital.

When perforation is suspected the patient is sent immediately to the x-ray department for an upright film of the chest. The majority of films plainly show a streak of air under the right diaphragm. The appearance of this free air in a suddenly ailing patient is almost absolute proof of a perforated viscus.

It makes little difference where the perforation is. Knowing that a perforation is present is all that is necessary. I refuse to waste valuable time trying to reason out the whys and wherefores and the locations. In the acute abdominal conditions, it seems to me to be far more important to decide whether surgery is necessary than to determine what has happened inside. I feel it to be to the patient's advantage to get in and fix what is wrong rather than to postpone surgery a day or two until all the diagnosticians can reach an agreement. Is it *surgical* or isn't it? That is the decision I strive to make—quickly!

Occasionally a patient with perforated ulcer may be in shock when first seen. Operation is postponed until the shock is under control by the use of plasma, blood, etc.

In cases of perforation the incision is made through the inner edge of the upper right rectus muscle. This is because the great majority of perforations are in the anterior aspect of the first inch of duodenum. In the ordinary case with a small perforation, the opening is closed with cotton mattress sutures. All closures are reinforced with a tag of omentum. If the perforation is too large to be drawn together with mattress sutures and the patient is in no condition for radical gastric resection, the perforation is carefully plugged with omentum which is held securely in place with many fine cotton sutures.

Large perforations permit the escape of large amounts of gastric contents, usually causing widespread contamination with foreign matter and irritating acid which calls forth a large quantity of slippery peritoneal exudate. Unless the patient is in excellent condition, we hesitate to open the lesser peritoneal cavity to contamination by doing a resection. If the contamination is extensive, but has been present for only a short time, we do not hesitate to resect a large portion of the stomach.

As much as possible of the slippery abdominal fluid is removed with special attention to the right lateral gutter and to the pelvis. In gross contaminations, a Penrose drain is placed in the right kidney fossa and is brought out through a stab wound in the flank. Another large Penrose drain is placed in the depths of the pelvis and is brought out through a stab wound in the midline just below the navel, care being taken to avoid a high-riding urinary bladder. It is quite likely that recovery would take place without the drains; however, the incidence of subdiaphragmatic and other walled-off collections has been practically nil among our patients and, until the value of the drains is disproved, we will most likely continue to use them.

Perforations on the posterior wall of stomach or duodenum seldom leak. The process of posterior perforation is a comparatively slow one, and, before the ulcer has eroded its way entirely through the wall of a viscus, the latter has had ample time to adhere to the tissue posterior to it, namely, the pancreas, mesocolon, etc. Such cases give rise to the hemorrhages and are of importance from that viewpoint, rather than from any other emergency angle.

Acute ulcers of the stomach and duodenum deserve the conservative attention of the surgeon. It is quite likely that many people at some time in their lives develop acute ulcerations which heal spontaneously before they get around to seeing their doctors. There is no reason to believe that an ulcer recurs once it has healed. Other ulcers may arise in the vicinity and heal in due time, but it is the tendency that is important. Just what factor lies behind the tendency, I do not know, but I am prepared to advise surgery to those patients who have recurring ulcerations.

Chronic ulcers are different. In my opinion, all chronic ulcers proximal to the pyloric vein had better be treated surgically if only because of the chance for malignant changes. I believe that most surgeons who operate in the upper abdomen hold the same opinion. A gastric ulcer that is removed along with half or more of the stomach cannot become malignant later.

Chronic ulcers in the duodenum are of great importance to the patient, not because they are prone to become malignant, but because they make life miserable and because they are potentially dangerous due to their tendency to perforate or hemorrhage. Furthermore, a duodenal ulcer which rots its way into the pancreas is not to be taken lightly.

I confess a certain degree of radicalism in my treatment of chronic gastric and duodenal ulcers. I have long since passed the period of conservatism wherein gastroenterostomy was supposed to do almost everything needed for ulcer. The backflow of bile from the duodenum, through the gastroenterostomy opening, was supposed to neutralize gastric acidity, thereby doing away with the most potent cause of ulcer. It was simple, when it worked. But the surgeon has to undo only a few of the fancy gastroenterostomies, with the stomas indurated and brittle from new ulceration, to make up his mind quickly that something is wrong with such treatment.

Believing that the benefits of gastroenterostomy are elusive in a great many cases, we have discarded it in the surgical treatment of chronic ulcer. Occasionally it is performed as a relief measure in inoperable carcinoma of the stomach. There may be some virtue in establishing a gastroenterostomy for the relief of fibrotic pyloric stenosis, but we believe a wide resection of the pathological area is a procedure which offers the patient a much better outlook.

In the past experiments were made with anterior gastroenterostomy in cases of leaking perforation. Following closure of the perforation a long loop of jejunum was brought up and anastomosed low on the anterior stomach. This plan was followed in an effort to evaluate the curative virtues resident in the flow of bile into the stomach. It was reasoned that the anterior anastomosis was a temporary expedient and that little difficulty would be experienced in undoing the anastomosis when the patient later underwent gastric resection. The method was abandoned after a patient experienced a perforation in the anterior surface of the jejunal loop which had been anastomosed some months previously.

We have come to believe that the Hofmeister[2] plan of gastric resection, with the antecolic anastomosis of a long loop of jejunum gives consistently excellent results with the minimum of danger to the patient. But it should be emphasized that no operation in the upper abdomen is safe unless a number of safeguards are thrown around the patient prior to the day of surgery.

The preparation for a gastric operation should begin at least 2 days before the actual cutting is done. The mortality rate in gastric resections done by careless surgeons in poorly staffed hospitals is very high. On the other hand, if the patient is properly prepared for surgery and the operation is carefully performed in a correct manner, the mortality rate is very low. The convalescence of the patient who has had proper preparation and surgery is as calm and as free of discomfort and complications as is any clean appendectomy.

The patient with a chronic ulcer is regarded as having been ill and undernourished for a long time. In other words, there is always doubt concerning the patient's ability to withstand surgery. This doubt is not an altogether natural reaction. For my part I rather *force* myself to be doubtful and then set out to prove that the doubts are unfounded.

The patient must have a good blood volume. The hemoglobin reading must be at least 80 per cent, although 85 per cent is better. His serum proteins must be between 6.5 and 7.2 mg. and his blood chlorides must be from 450 to 520 mg. His urine must be albumin- and sugar-free. He must have normal vital capacity, a good cardiac reserve, and a minimum of chest pathology as shown by x-ray.

Members of the anesthesia department at Art Centre Hospital refuse to administer anesthesia to any patient who fails to measure up to the above standards. They have the backing of the surgeons.

Surgery, in substandard patients, is postponed until the abnormalities can be overcome. Low hemoglobin is brought up by repeated blood transfusions, low serum proteins are raised by intravenous administration of 5 per cent protein hydrolysate in 5 per cent glucose solution, and low chlorides by intravenous administration of sodium chloride. Radical surgery is not performed in patients with marked disease of lungs, heart, kidneys, liver, etc.

The type of anesthetic is chosen by members of the anesthesia department, who are thoroughly trained and better able than the surgeon to bear the responsibility of the patient's period of unconsciousness. The materials most often used are a combination of monocaine and nupercaine, 100 mg. of the former with from 6 to 9 mg. of the latter, depending upon the weight of the patient. The subarachnoid injection of those drugs, with cyclopropane-oxygen supplement, has been found quite satisfactory. Intravenous curare is used if abdominal rigidity proves to be a hindrance.

The patient's stomach is irrigated through a Rehfuss tube on the morning of surgery. Intubation following operation has not been found necessary.

The abdominal cavity is entered by an incision through the inner edge of the upper left rectus abdominis muscle. The edges of the incision are not protected in any way. After the abdomen is explored and the need for gastric resection is verified, a strip of moist gauze is drawn back of the stomach, through the gastrohepatic and gastrocolic omenta. This gauze strip serves as a traction rope, enabling the surgeon to draw the stomach freely in any direction, and the openings through which the gauze passes afford good starting points for the omental ligatures. The use of the gauze traction strip has been well described in "Surgical Practice of the Lahey Clinic."[2]

The omenta are clamped, cut, and ligated in sections with No. 20 cotton, the middle colic vessels being identified frequently to keep them out of harm's way. In severing the omenta a curved hemostat is thrust through a portion and, as the hemostat is spread, the assistant clamps the portion so isolated; the surgeon then places his clamp on the same section and the tissue between the clamps is cut with scissors. Ligatures are placed as the clamps are removed. In this way, half or more of the stomach is quickly freed. The pyloric region and first portion of the duodenum are carefully freed by clamping and cutting the vascular attachments above and below.

The dissection of the posterior stomach and duodenal walls from the pancreas, offers considerable difficulty in some cases. It is frequently necessary to include a thin layer of pancreatic tissue in the dissection. I have no fear of the accidental opening of the gastric or duodenal mucosa in these difficult cases.

The duodenum is freed for a distance of 2 or more inches, or sufficiently to permit the placing of crushing clamps well below the pylorus and still leave enough duodenum to permit safe closure. The presence of the common bile duct in the vicinity is never forgotten. If there is uncertainty about its position, it is traced down from the cystic duct and visualized by incising the tissues which cover it.

The freed duodenum is clamped with a Furniss clamp distally and with a Payr clamp immediately proximal to the former. A No. 0 chromic gut thread, swaged on a long straight needle, is passed through the Furniss clamp and held. The duodenum is cut across with the hot cautery. The Furniss clamp is removed from the duodenal stump and the chromic thread is tied, puckering the stump into a cone-shaped tissue which is then easily invaginated under a purse-string suture with No. 20 cotton. Occasionally, a cotton mattress suture is placed to reinforce the purse-string. Over all is stitched a tag of omentum which

is drawn up from the vicinity. I have never used any of the complicated sewing or clipping instruments in resections, relying, rather, upon manual dexterity and the old-fashioned rubber-covered clamp.

When half or more of the stomach has been freed, the rubber-covered clamp is placed proximal to the line of proposed resections, and a Payr clamp is placed about ¾ of an inch distally. The stomach is cut across with straight scissors close to the Payr clamp, and the gastric stump is caught with Allis forceps to keep it under control. The plan is to leave from 2 to 2½ inches of open stomach at the greater curvature for anastomosis to the jejunum; therefore, the lesser curvature aspect of the gastric stump is closed with two layers of stitches, a mucosal (all thickness) row of fine chromic gut and an inverting row of fine cotton to the serosa. Prior to placing the serosal stitches, the upper corner of the closed stomach (the lesser curvature corner) is buried under a cotton purse-string suture.

At this point the surgeon and assistants wash their gloves.

Beginning at Treitz's ligament, the jejunum is drawn up out of the abdomen, a loop at a time until a good part of it is in view. As Lahey[4] says, ". . . pull out plenty of jejunum and then . . . pull out quite a little more." It is very important that sufficient jejunum be delivered to permit retraction of the gastric stump and to allow for the surprising amount of relaxation and contraction of the intestinal loop. If the jejunal loop concerned in the anastomosis is longer than needed, it seems to make little difference, but if it is too short, the purpose of the operation may be defeated.

A portion of the jejunal wall (rather far distal to the ligament of Treitz) is grasped with the rubber-covered clamp. The clamps holding the gastric stump and the jejunum are placed side by side, and the two organs are anastomosed with two rows of stitches, fine chromic gut to the mucosa and fine cotton to the serosa. The angles of the anastomosis are reinforced with additional stitches, and the lesser curvature portion of the stomach (which had been closed previously) is covered with adjacent jejunum which is stitched in place.

The entire field of operation is reinspected for bleeding points. Blood collections are mopped up. The abdominal incision is closed in layers with cotton. A light frosting of sulfanilamide crystals is dusted into the incision following closure of the peritoneum. The peritoneum is closed with continuous No. 20 cotton sutures and the fascia with interrupted stitches of the same material. The skin is closed with Michel's clamps which are reinforced with a few alternating stitches of No. 60 cotton. No stay sutures are used. The metal clips are removed on the third day, the cotton stitches are left from 12 to 21 days. Strange as it may seem, little trouble is had with incisions. No effort is made to protect the edges during operation and no abdominal or incisional drainage is established.

My operating time in gastric resection has ranged from 57 to 105 minutes. However, I once worked for 2 hours and 30 minutes on a case requiring the undoing of a posterior gastroenterostomy, with the upper abdomen a mass of adhesions.

Intravenous administration of 1000 cc. of 5 per cent alcohol in glucose-saline solution is begun as soon as the patient is back in his bed. He rests in a state of euphoria throughout the afternoon, and seldom requires an opiate—in fact, opiates are seldom required postoperatively. At 5 p.m. the head of the bed is raised. At 5:30 the patient is raised to a sitting position on the side of the bed for a few minutes and then is helped to his feet. With the aid of an interne, he takes a few steps around the room before he is put back into bed. Throughout the afternoon he has had swallows of cool water, an ounce at a time, as often as was reasonable.

The morning following operation, the patient is helped from bed and walks to the bathroom, with or without assistance. He sits on the toilet and urinates. Sometimes his bowels move. (A number of patients have scrambled out of bed on the morning following gastric surgery, gathered up their toilet articles, gone to the bathroom, and stood before the mirror to shave.) After the patient returns to bed, he is given 2 ozs. of junket or gelatine and 2 ozs. of homogenized milk. This diet is continued for 3 or 4 days after which soft eggs, hard toast, and clear soups are added.

By the second postsurgical day, the patient is in and out of bed at will. He requires no urinal, no catheter, no bedpan. It is not unusual to find him sitting up in a chair playing cards with other patients. Usually, by the sixth or seventh day, the patient has walked out of the hospital, climbed into the family car, and been driven home.

It is definitely my opinion that satisfactory gastric surgery is dependent upon the utilization of modern hospital facilities. Such facilities include efficient laboratory service, anesthesia administered by conscientious experts, and a smoothly working surgical team.

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2. The Lahey Clinic: Surgical practice of the Lahey Clinic, Boston, Massachusetts. W. B. Saunders Co., Philadelphia, 1941.

3. *Op. cit.*, ref. 2, p. 227.

4. *Op. cit.*, ref. 2, p. 234.

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**TUBERCULOSIS**

In view of the fact that many healthy individuals carry living tubercle bacilli in their bodies without apparent harm, and that a considerable time may elapse between infection and disease, it is obvious that *the development of tuberculosis depends more on the nature of the "soil" than on the presence of the "seed."* Although much has been written, little concrete information is available on the various factors influencing the course of tuberculosis. From available evidence one is led to believe that the factors which determine infection in one instance and disease in another, and the eventual outcome in the latter, are inherent in the constitutional makeup of the individual. The type and virulence of the infecting organism play a secondary role. In any specific instance, the development of tuberculosis depends on the interplay of two factors: (1) the intensity of the infection, and (2) the receptivity of the host. (Italics supplied.)—Diseases of the Chest, With Emphasis on X-ray Diagnosis, by Eli H. Rubin, M.D., F.A.C.P., F.C.C.P., W. B. Saunders Company, Philadelphia, 1947, pp. 176-177.

# Acute Infectious Lymphocytosis

## A New Disease Entity

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In a survey of 45 nursery children at the New York Osteopathic Clinic in the Spring of 1947, routine studies revealed a provocative blood picture. Two children, aged 4 and 6, presented a hyperleukocytosis with an absolute lymphocytosis. No signs or symptoms of any disease could be observed, and the children's behavior was normal. There was no splenomegaly, hepatomegaly, or lymphadenopathy. Within the next 8 weeks, 6 additional cases were observed with similar signs, symptoms, and laboratory findings. All the children appeared to be well and attended nursery classes without interruption. In every instance the behavior pattern of these children was normal from onset to recovery, as ascertained by careful observation and constant checking with both parent and nursery teacher.

An analysis of medical literature disclosed 55 cases presenting similar hematologic findings which have been identified as acute infectious lymphocytosis by Carl H. Smith[1] of New York Hospital.

Acute infectious lymphocytosis is a specific clinical entity of unknown etiology. It is characterized by a leukocytosis with an absolute lymphocytosis (the predominant cell being the small mature lymphocyte); absence of splenomegaly, hepatomegaly and lymphadenopathy; and negative results of the Paul-Bunnell (modification of the heterophile antibody) test. The disease occurs sporadically or in epidemic form and is infectious and moderately contagious as evidenced by the occurrence of 8 cases in a group of 45 children.

The duration of leukocytosis according to Smith[2] is from 2 to 7 weeks, a period consistent with the findings in these 8 cases. The clinical symptoms may be so mild as to escape detection, or the disease may be ushered in by varying degrees of constitutional reactions. The diagnosis is often made upon a routine or accidental blood count.

### CASE REPORTS

*Case I.*—R.T., a boy 4 years of age, received a routine blood count on April 9, 1947, as a part of the preventive medicine program of the New York Osteopathic Clinic for children of the Wayside Day Nursery.[3] The count revealed a hyperleukocytosis of 35,000 cells per cu. mm., with 85 per cent small mature lymphocytes. The remainder of the Schilling index was normal. No immature cells were present. The hemoglobin was 15.1 gm. per 100 cc. and the erythrocytes numbered 6,120,000 per cu. mm., an increase from 4,900,000 at the previous count. Physical examination of the child did not reveal any change since his previous examination a week prior, April 3, 1947, at which time the child had completed a series of penicillin injections for chronic mastoiditis. The past history revealed numerous bouts of acute upper respiratory infection complicated by otitis media. The patient had been treated for chronic pansirusitis and chronic follicular tonsillitis. X-ray of the mastoids had revealed the chronic mastoiditis which had subsequently been successfully treated with penicillin.

A recheck of the white blood count 2 days later, April 11, 1947, revealed an increase to 48,700 leukocytes per cu. mm. with 88 per cent small lymphocytes. The erythrocyte sedimentation rate was 7.2 mm. per hour, Cutler method, and the heterophile antibody reaction was positive only to a dilution of 1:56, thus aiding in ruling out infectious mononucleosis. On April 16, 1947, re-examination of the child revealed inflammation of the tonsils and pharynx with a marked postnasal drip and temperature of 100.4 F. This was the first temperature elevation noted since the abnormal blood count was discovered. Two days later, the inflammation of the fauces and pharynx increased. No elevation of temperature was noted.

The only treatment received during this period was osteopathic manipulative therapy, forced fluids, and rest. The count on April 30, 1947, was reduced to 26,000 leukocytes per cu. mm. with 68 per cent small lymphocytes, and on June 4, 1947, 7 weeks after the onset, it was reduced to 13,200 white blood cells per cu. mm. with 35.3 per cent lymphocytes. It was also noted that there was a decrease in hemoglobin and in the number of erythrocytes with each count that demonstrated a reduction in the leukocytes. A tuberculin patch test was negative, as was a chest x-ray. The results of urine examinations during this period were all negative. The child reported to the clinic on April 30, 1947, following tonsillectomy and adenoidectomy. No complications or sequelae were noted.

The presence of a mild upper respiratory infection during the course of this illness was not necessarily typical of acute infectious lymphocytosis. The history of frequent upper respiratory infections led the attending physician to conclude that the respiratory infection was coincidental with the elevated blood count.

The New York City Department of Health was notified when it was found that several other children had developed similar blood findings.

*Case II.*—D.M., a boy aged 6, presented a hyperleukocytosis on April 9, 1947 (simultaneously with Case I). Blood examination disclosed 25,000 leukocytes per cu. mm. with 77 per cent small lymphocytes and no abnormal cells. The erythrocytes numbered 4,460,000 per cu. mm., an increase from 4,370,000 on March 5, 1947; the hemoglobin had increased to 14.4 gm. per 100 cc. from the 12.8 gm. recorded at the previous examination. The child had been receiving hematinic therapy which might have accounted for the increase in hemoglobin. Results of physical examination were essentially negative. There were no lymphadenopathies, splenomegaly, or hepatomegaly. One week later, on April 16, 1947, the child presented evidence of an acute upper respiratory infection with inflammation of the pharynx and the presence of a thick mucopurulent nasal discharge. The tonsils were hypertrophic and a grayish mucoid membrane covered the left tonsil. On April 23, 1947, the respiratory infection was markedly improved, the nasal mucous membrane had returned to normalcy, and a blood examination made on April 30, 1947 (3 weeks after the illness was discovered), revealed 12.8 gm. of hemoglobin per 100 cc., 4,680,000 erythrocytes per cu. mm. and 11,200 leukocytes per cu. mm. with 40.6 per cent lymphocytes. Results of tuberculin patch tests, chest x-ray, and urinalysis were negative.

*Case III.*—C. W., a girl 3 years of age. Routine examination on April 16, 1947, revealed 43,900 leukocytes per cu. mm. with 90.3 per cent small lymphocytes and no abnormal cells. Since the examination on March 19, 1947, there had been no significant change in the number of erythrocytes although there was a decrease in the hemoglobin from 15.0 gm. to 12.3 gm. per 100 cc. between examinations. The heterophile antibody test was positive to a 1:56 dilution. There had been a recent bout of acute pharyngitis on March 20, 1947, but no symptoms were present when the discovery of hyperleukocytosis was made. Lymphadenopathy, splenomegaly, and hepatomegaly were absent. A recheck on April 30, 1947 (2 weeks after the infection was noted), revealed 12,200 white blood cells per cu. mm. with 44 per cent lymphocytes. The erythrocyte sedimentation rate was 6.2 mm., Cutler method, and results of the tuberculin patch test and chest x-ray were negative.

*Case IV.*—R.W., boy 5½ years of age, presented on April 23, 1947, a hyperleukocytosis of 49,800 cells per cu. mm. with 86.6 per cent small lymphocytes. The only immature cells noted were 0.6 per cent lymphoblasts. There were 4,620,000 erythrocytes per cu. mm. and 13.7 gm. of hemoglobin per 100 cc. as compared with 5,120,000 erythrocytes and 15.8 gm. of hemoglobin found at examination on March 26, 1947. Physical examination did not bring to attention any symptoms of disease. A recheck on May 6, 1947, showed 64,200 leukocytes with 71.6 per cent small lymphocytes, and a reduction of erythrocytes to 4,360,000 with 12.8 gm. of hemoglobin. On June 4, 1947, 6 weeks after the abnormal blood count was discovered, the white blood count approached normalcy with 8,400 cells per cu. mm. and 29.2 per cent total lymphocytes; there were 4,450,000 red blood cells per cu. mm. and 12.8 gm. of hemoglobin per 100 cc. of blood.

*Case V.*—C.R., boy 5 years of age, had a blood count on May 2, 1947, when a survey of the remainder of the children was completed. There was found a leukocytosis of 46,800 cells per cu. mm. with 77 per cent small lymphocytes. No opportunity arose for further blood checks as the child left the nursery group.

*Case VI.*—R.A., 2½ years of age, was found to have a normal count on April 9, 1947, when the first 2 cases were isolated. There were 15,050 leukocytes per cu. mm., 4,470,000 erythrocytes per cu. mm. with 14.5 gm. of hemoglobin per 100 cc. of blood. On May 6, 1947, 4 weeks later there were found 44,400 leukocytes per cu. mm. with 78 per cent small lymphocytes, and a red blood cell count of 4,190,000 with 13.2 gm. of hemoglobin. Plasmacytes (0.3 per cent) were the only abnormal cell type present. Results of physical examination were negative. On June 11, 1947, there was obtained a normal count of 9,200 leukocytes with 53 per cent lymphocytes.

*Case VII.*—R.T., a boy 5 years of age (brother of R.T., Case I), was examined on April 22, 1947, 2 weeks after his brother presented the abnormal blood picture. There were 13,900 leukocytes per cu. mm., a finding consistent with previous blood counts; 4,160,000 erythrocytes per cu. mm. and 10.9 gm. of hemoglobin per 100 cc. of blood. The Schilling differential count revealed 8.3 per cent eosinophils, 0.6 per cent basophils, 4.6 per cent stab cells, 52.6 per cent polymorphonuclear neutrophils, 0.3 per cent large lymphocytes, 31.3 per cent small lymphocytes, and 2.0 per cent monocytes. The eosinophilia had persisted for many months and the cause had not been ascertained. He underwent tonsillectomy and adenoidectomy on April 27, 1947 (at the same time as his brother) without complications. On May 21, 1947, there were 57,200 leukocytes with 63.3 per cent small lymphocytes, and 0.3 per cent lymphoblasts. The other cells were present in approximately the same numbers as before. The erythrocytes had increased to 4,980,000 with 13.3 gm. of hemoglobin. The past history revealed frequent acute upper respiratory infections and chronic follicular tonsillitis.

On May 28, 1947, re-examination revealed the presence of a marked mucopurulent postnasal drip. On June 4, 1947, an erythematous rash was noted on the left thigh. The cause was not determined and it soon disappeared without treatment. No association with the hyperleukocytosis could be ascertained. The results of blood Wassermann, tuberculin patch test, and chest x-ray were negative. Recheck on June 9, 1947, presented 22,500 leukocytes with 49 per cent small lymphocytes, and 5,080,000 erythrocytes with 14.3 gm. of hemoglobin.

*Case VIII.*—M.L.R., a girl 2½ years of age, presented the following blood picture on May 14, 1947 (when her classmate, R.A., Case VI, presented positive findings): erythrocytes 5,110,000 with 14.1 gm. of hemoglobin, and 16,300 leukocytes with 38 per cent small lymphocytes, 3.3 per cent monocytes, 2.0 per cent eosinophils, 0.3 per cent basophils, 3.3 per cent stab cells, 51.3 per cent polymorphonuclears, and 1.6 per cent large lymphocytes. Results of the heterophile antibody test were negative. There were no abnormal cells present as found in infectious mononucleosis. A tuberculin patch test was given with negative results. Upon a subsequent blood count on June 17, 1947, a hyperleukocytosis of 58,800 cells was present with 79.6 per cent small lymphocytes and 4,500,000 red blood cells with 14.5 gm. of hemoglobin. There were no clinical signs of any illness.

## ANALYSIS

The first evidence of acute infectious lymphocytosis was noted in the blood counts of R.T., aged 4, and D.M., aged 6, on April 9, 1947. In the former, laboratory examinations ruled out infectious mononucleosis in spite of the existing lymphocytosis. An unusual finding was the normal sedimentation rate in the presence of the exaggerated leukocytosis. On April 16, while the leukocytosis in Case I (R.T.) was at its peak, Case III (C.W.) was discovered. On April 23, Case IV (R.W.) came to light; the peak leukocytosis was reached 14 days later at which time Case V (C.R.) and Case VI (R.A.) were found. On May 21, R.T. (Case VII, brother of Case I) was discovered to have a hyperleukocytosis. On June 11, 35 days after her classmate R.A. (Case VI), M.L.R. (Case VIII) was found to have developed acute infectious lymphocytosis.

The range of hyperleukocytosis was from 25,000 to 64,200 leukocytes per cu. mm. as compared with a low of 18,400 and a high of 120,000 cells as previously reported.[2] In this series the percentage of small mature lymphocytes varied from 63.3 to 90.3 per cent as compared to a range of from 54 to 99 per cent reported elsewhere.[2]

Three of the cases being reported occurred in females, 5 in males. The ages varied from 2½ to 6 years (the extremes of ages in the group studied). Most of the reported cases have occurred before the tenth year,[3] and the preponderance before the fifth year.[4] Acute

infectious lymphocytosis has also occurred in young adults.[5,6]

A study of the contagion of the disease reveals its simultaneous discovery in two children of different school classes, who were in contact during play periods. The white blood cell count in Case II returned to a normal level 1 week before that in Case I. Seven days after the disease state was noted, a third case was found. Fourteen days after the first reported case, a fourth case was discovered. These cases suggest an incubation period of from 7 to 14 days.

Fourteen days after Case IV had been found and at the peak of his infection, Case V was discovered. These cases may have developed simultaneously, but since they were not checked at the same time there was no proof as to the relationship or coexistence of the infections. The source of contagion of Case VI may have been his classmate, Case III, any of the children, contacts, or carriers; i.e., teachers, maids, waitresses, etc.

In Case VI a normal count was noted when the first two cases were disclosed. Four weeks later (21 days after his classmate Case III presented an elevated count), he too showed a leukocytosis. The incubation period in this instance may, therefore, have been 3 weeks. At the time when the disease was incubating in Case VI, a classmate, Case VIII, had a normal blood count. On June 11, 1947, 35 days later Case VIII presented a leukocytosis. Since no intervening count was done, the onset of this infection may have been less than 35 days. It is also interesting to observe that Case VII, presented a positive blood picture 35 days later than his brother, Case I. A check of Case VII 2 weeks after the onset of the disease in the younger brother, revealed a normal count. It can, therefore, be concluded that the incubation period may vary from 7 to 35 days.

The fact that all of these children had been in contact with one another, proves conclusively that the disease is contagious and possesses an epidemic characteristic.

The method of spread is unknown, but it is believed to be by personal contact. The existence of carriers has not been determined. There is insufficient information concerning immunity. The etiologic agent is unknown. There is no disagreement as to the infectious character or to the fact that it is contagious. Attempts to identify the causative organism have been unsuccessful. Smears and cultures of material from the noses and throats of patients reveal organisms similar to those present in patients without acute infectious lymphocytosis.[2] The possibility of a specific virus has been mentioned. Virus diseases, however, tend to produce a leukopenia with a relative lymphocytosis.

## CLINICAL PICTURE

The symptoms vary from that of a benign infection without clinical evidence of disease, to sudden onset of high fever and varying degrees of constitutional reaction. Most often the disease appears to be asymptomatic and is discovered only upon a routine or chance blood count.

Such was the case with this series of 8 cases, and with the series of 21 cases reported by Finucane and Philips.[4] Thelander and Shaw[7] reported a case in a child with acute onset and symptoms suggesting meningitis, with a hyperleukocytosis of 45,700 cells per cu. mm. and with 81 per cent lymphocytes.

Beloff and Gang[8] reported a case in a girl, 6½ years of age, with sudden onset of high fever (104 F.),

TABLE I - BLOOD STUDIES

| Name | Age | Date 1947 | Hemoglobin Gm. per 100 Cc. | Erythrocytes Millions per Cu. Mm. | Leukocytes per Cu. Mm. | Neutrophils Percentage Polys | Neutrophils Percentage Band | Lymphocytes Percentage Large | Lymphocytes Percentage Small | Monocytes Percentage | Eosinophils Percentage | Basophils Percentage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R. T... | 4 | 3/6 | 14.8 | 4,900 | 15,600 | 61.3 | 8.6 | 0.3 | 25.3 | 3.0 | 0.0 | 0.0 |
| (Case I) | | 4/9 | 15.1 | 6,120 | 35,000 | 11.6 | 2.0 | 0.0 | 85.0 | 0.3 | 1.0 | 0.0 |
| | | 4/11 | .... | ..... | 48,700 | 8.6 | 1.3 | 0.6 | 88.0 | 0.0 | 1.3 | 0.0 |
| | | 4/17 | .... | ..... | 57,800 | 9.6 | 2.6 | 3.6 | 81.0 | 1.0 | 1.6 | 0.3 |
| | | 4/30 | 14.6 | 5,050 | 26,000 | 24.6 | 3.6 | 0.6 | 68.0 | 0.3 | 2.6 | 0.0 |
| | | 6/4 | 13.6 | 4,730 | 13,200 | 49.0 | 12.0 | 1.3 | 34.0 | 2.6 | 1.0 | 0.0 |
| D.M... | 6 | 3/5 | 12.8 | 4,370 | 10,300 | 53.6 | 5.0 | 2.3 | 28.3 | 4.3 | 5.3 | 0.3 |
| (Case II) | | 4/9 | 14.4 | 4,460 | 25,000 | 19.6 | 1.3 | 1.0 | 77.0 | 1.0 | 0.0 | 0.0 |
| | | 4/30 | 12.8 | 4,680 | 11,200 | 48.3 | 2.3 | 2.3 | 40.6 | 2.3 | 3.0 | 0.0 |
| C.W... | 3 | 3/19 | 15.0 | 4,630 | 9,900 | 30.0 | 7.0 | 3.0 | 53.6 | 5.3 | 1.0 | 0.0 |
| (Case III) | | 4/16 | 12.3 | 4,660 | 43,900 | 4.3 | 0.6 | 4.0 | 90.3 | 0.3 | 0.0 | 0.3 |
| | | 4/30 | 12.5 | 4,380 | 12,200 | 46.0 | 4.0 | 2.0 | 44.0 | 2.6 | 1.0 | 0.3 |
| R.W... | 5 | 3/26 | 15.8 | 5,120 | 10,700 | 40.3 | 7.3 | 1.3 | 44.0 | 4.6 | 2.3 | 0.0 |
| (Case IV) | | 4/23 | 13.7 | 4,620 | 49,800 | 5.0 | 2.6 | 1.0 | 86.6 | 2.0 | 2.6 | 0.0 |
| | | 5/6 | 12.89 | 4,360 | 64,200 | 22.3 | 2.3 | 1.3 | 71.6 | 0.6 | 1.3 | 0.3 |
| | | 6/4 | 12.8 | 4,450 | 8,400 | 65.0 | 4.3 | 0.6 | 28.6 | 0.6 | 0.6 | 0.0 |
| C.R... | 5 | 1/9 | 13.6 | 4,770 | 8,700 | 41.3 | 2.0 | 1.3 | 49.0 | 4.3 | 1.6 | 0.3 |
| (Case V) | | 5/6 | .... | ..... | 46,800 | 15.0 | 1.6 | 1.0 | 77.0 | 1.3 | 0.3 | 0.3 |
| R.A... | 2 | 4/9 | 14.5 | 4,470 | 15,050 | 41.3 | 1.6 | 5.0 | 47.0 | 3.0 | 1.6 | 0.3 |
| (Case VI) | | 5/6 | 13.2 | 4,190 | 44,400 | 14.8 | 1.6 | 1.0 | 78.0 | 1.0 | 3.3 | 0.0 |
| | | 6/11 | 13.5 | 4,920 | 9,200 | 38.5 | 3.0 | 0.0 | 53.0 | 2.5 | 1.0 | 2.0 |
| R.T... | 5 | 4/22 | 10.9 | 4,160 | 13,900 | 52.6 | 4.6 | 0.3 | 31.3 | 2.0 | 8.3 | 0.6 |
| (Case VII) | | 5/21 | 13.3 | 4,980 | 57,200 | 17.0 | 5.0 | 5.0 | 63.3 | 1.0 | 7.3 | 1.0 |
| | | 6/9 | 14.3 | 5,080 | 22,500 | 37.0 | 9.3 | 0.3 | 49.0 | 0.3 | 4.0 | 0.0 |
| M.L.R... | 2 | 1/30 | 15.2 | 5,340 | 22,800 | 36.6 | 6.3 | 2.0 | 48.6 | 5.0 | 0.6 | 0.0 |
| (Case VIII) | | 5/14 | 14.1 | 5,110 | 16,300 | 51.3 | 3.3 | 1.6 | 38.0 | 3.3 | 2.0 | 0.3 |
| | | 6/17 | 14.5 | 4,500 | 58,800 | 12.6 | 3.0 | 1.6 | 79.6 | 0.6 | 2.3 | 0.0 |

stiff neck, and slight facial weakness of the right side. There were no other significant findings. A spinal tap revealed 50 cells per cc., chiefly mononuclear. On the second day the temperature returned to normal, the spinal fluid was free of cells, and the child was asymptomatic except for slight pain in the calf of the leg. During this period the white blood cells increased from 26,400 to 50,600 and the lymphocytes from 70 to 81 per cent. On the twentieth day, the blood count was normal. Duncan[5] reported the case of a 4-year old child admitted to the hospital with hyperpyrexia, generalized abdominal pain, headache, irritability, and tenderness and rigidity of the abdomen. The highest leukocyte count was 110,000 cells with 92 per cent lymphocytes. Israels[9] reported a case in a child 4 years of age, with a history of vomiting for 4 days and drowsiness for 1 day. Temperature was 100.2 F., pulse 100, and respiration 16. Had the child presented any other neurologic signs, lumbar puncture would have been done. Diagnosis was made upon the blood findings.

In the literature there are reports of skin eruptions. Yuskis[6] reported the presence of asymmetrical, red, maculopapular eruption on the hips, thighs, and legs which disappeared after a short time. Duncan[10] reported the presence of a generalized morbilliform eruption which disappeared shortly after its onset. In Case VII of my series an unidentified erythematous eruption on the left thigh was noted. It appeared after the peak of the infection and was of short duration.

The most frequently associated symptoms are those referable to the nasopharynx. When present, they were those of a mild upper respiratory infection. In some cases there was a history of recent respiratory infection.

The presence of abdominal pain, tenderness, and rigidity as noted in some cases suggests that in pediatric practice the possibility of acute infectious lymphocytosis must be ruled out before surgical intervention. The presence of neurologic symptoms has also been noted. Headache, irritability, drowsiness, pain, stiff neck, and cells in the spinal fluid may all produce confusion in diagnosis.

### DIAGNOSIS

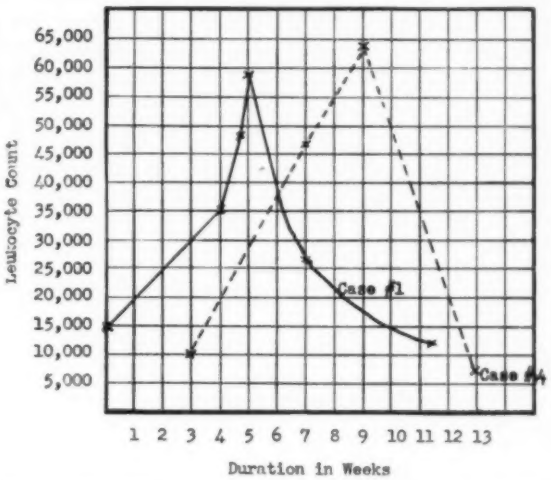
The symptom picture in acute infectious lymphocytosis may simulate a variety of diseases. The diagnosis must rely upon the typical blood findings and the absence of lymphadenopathy and splenomegaly. The distinguishing feature is the predominance of the small mature lymphocyte of uniform size and normal structure. There is an absolute increase in the small lymphocyte and absence of immature cellular elements, except those found in normal blood. The cells of acute infectious lymphocytosis differ from those in infectious mononucleosis, as the latter are vacuolated, irregular in size and shape, and have a foamy cytoplasm.

### DIFFERENTIAL DIAGNOSIS

In making the differential diagnosis there should be considered those diseases which produce a lymphocytosis; these include measles, German measles, mumps, Malta fever, malaria, influenza, typhoid fever, tuberculosis, undulant fever, dengue fever, aplastic anemia, agranulocytosis, and aleukemic leukemia.[11] However, these diseases produce a relative lymphocytic increase with a depression of the number of segmented neutrophils, without necessarily, a total increase of the number of lymphocytes. Pertussis, infectious mononucleosis, lymphatic leukemia, and leukemoid reaction

FIGURE I

Graphic Representation of the Total Leukocyte Count in Acute Infectious Lymphocytosis




of the lymphoid type[12] may simulate the blood picture found in acute infectious lymphocytosis.

A marked or high lymphocytic leukocytosis may occur in pertussis. It is initiated early in the catarrhal stage, and reaches its peak at the height of the paroxysmal stage, after which it subsides. The total leukocyte count usually varies from 15,000 to 30,000 but may reach 100,000 with the lymphocytes as high as 90 per cent. The differential diagnosis is made from the clinical picture and laboratory findings.

Infectious mononucleosis characteristically produces a lymphocytic leukocytosis with cell counts as high as from 20,000 to 50,000, and with the lymphocytes ranging from 60 to 90 per cent.[11] The differential diagnosis is made upon an increase in monocytes, the presence of large, irregular, vacuolated, immature lymphocytes, and positive results of the heterophile antibody test.

Acute lymphatic leukemia must also be differentiated from acute infectious lymphocytosis. In the former, the leukocyte count is variable. It may not reach 15,000 or it may exceed 100,000, fluctuating readily. Large immature cells (lymphoblasts) predominate, although there is usually a large percentage of lymphocytes. Many of the lymphocytes are atypical and large, containing a lobulated nucleus. In lymphatic leukemia, there is frequently a high relative and absolute lymphocytosis with over 90 per cent of the total count consisting of lymphocytes. The presence of lymphoblasts represents the most important element in the differential diagnosis of lymphatic leukemia and acute infectious lymphocytosis. In the former there may be present enlargement of the spleen and lymph nodes to aid in differentiating it from the latter.

Certain diseases such as extreme septic states, crises of hemolytic jaundice, sickle cell anemia, polycythemia vera, syphilis (rarely), and certain anemias of childhood, may show, at times, granulocytic or lymphocytic cells of such immaturity and in such numbers as to appear leukemic in nature. These are called leukemoid reactions. In a leukemoid reaction of the lymphocytic type, there are present in the blood, spe-

cific immature cells, atypical cells of the lymphocytic series. A leukemoid reaction resulting from infection is transitory, whereas the blood picture in acute infectious lymphocytosis persists for weeks.[12]

SUMMARY

Acute infectious lymphocytosis is of significance to pediatricians because of its bizarre symptom picture and the similarity of some of its symptoms to those of other childhood diseases. The discovery of this disease entity increases our knowledge of the existence of diseases which may not present clinical evidence of illness and which may be prevalent without discovery. It suggests the possible existence of other diseases, benign in character, which might have existed for many years, or whose impact might have been manifested only since the advent of chemotherapy in the treatment of infectious diseases.

1. Eight cases of acute infectious lymphocytosis have been presented.

2. Acute infectious lymphocytosis is a specific disease entity of unknown etiology, characterized by hyperleukocytosis with an absolute lymphocytosis and without splenomegaly or lymphadenopathy.

3. The disease is infectious and communicable and may appear sporadically or in epidemic form. In this series, the incubation period was from 7 to 35 days, and the duration of the hyperleukocytosis varied from 2 to 5 weeks.

4. In my series there were no symptoms referable to acute infectious lymphocytosis such as have been reported in some cases. In 4 of my cases which presented symptoms of upper respiratory infection, it was believed that the respiratory involvement was purely coincidental.

5. The pathognomonic feature of this disease is the presence of a leukocytosis, the predominant cell being a small mature lymphocyte. In this series the counts varied from 25,000 to 64,000 leukocytes per cu. mm. with from 63 to 90 per cent lymphocytes. The results of the Paul-Bunnell test were negative.

6. In 50 per cent of this series there was an associated increase in the erythrocytes suggesting that the infection specifically affects the erythropoeitic centers. None of the other investigators have, however, reported any similar effect upon the red blood cells.

7. There are no serologic tests to assist in diagnosis. Those used in the cases which have been reported, were used to rule out other diseases—i.e., infectious mononucleosis, pertussis, etc.

8. The disease is benign. The prognosis is good. No special treatment is indicated, and no sequelae have been reported.

245 W. 25th St.

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ON THE PHILOSOPHY OF MEDICINE

I would like first to remind you that the place of medicine among the sciences is both central and unique. In its original motivation, medicine differs from the other sciences, concerned as it is with matters very close to essential human anxieties. From the beginning the medical investigator has stood in a special moral relation to his society, a relation rather different from that of the engineer or the mathematician. It can be shown historically that the morality of science —in its unity and discipline in the search for truth, its determination to follow the truth lead where it may—has not come about automatically or accidentally, but through a struggle in which the example and influence of medicine have been a decisive influence.

* * *

Perhaps the greatest challenge, to which its own progress has led the medical profession, is in the field of psychology. As our knowledge of human personality increases, it becomes more and more clear that we are involved in the study of a network of relations which cannot be localized within the organism. . . . The human infant is human only potentially. He becomes actually human only through a process of social maturation set in motion by the mother-environment of early years. The adult personality, in turn, exists only through his relations to the social and physical environment. When these relations are distorted, the personality is distorted. The richness of a personality is inseparable from the richness of its working connections with the world. A person who lacks dynamic relatedness with his environment is to that degree not much of a person.—David Hawkins, Ph.D., *The Diplomate*, October, 1948.

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## THE DOCTOR OF OSTEOPATHY

The House of Delegates of the Association passed significant amendments to the Code of Ethics last July. The amendments, more in the way of amplification and specification of old principles and of indefinite phraseology than of enunciation of new principles, were enacted after exhaustive discussion and without a dissenting vote. From the beginning of the discussion, which was not initial in this year's House, there was apparently no dissent as to objective. Only methods of accomplishing the purpose were discussed.

During the life of the profession and its representative Association, there has been evident an increasing respect for and interest in osteopathic education and its ability to produce well-trained physicians particularly adept at the application of principles peculiar to the osteopathic concept. That interest has led the profession to formulate a standardized undergraduate educational program and that standard, with its increasing requirements, has come to be accepted by the law of the land and its component states. In increasing measure the standard has been accepted by the public as evidence of good faith on the part of the profession. The independent position of the profession, its evident intent to develop the osteopathic concept, justified that confidence.

From the beginning, in an effort to bring to fuller fruition and application the concepts of Still, every representative body of the profession has reiterated the necessity of the maintenance of a separate school of practice. The degree awarded to graduates of osteopathic colleges for more than 50 years has been Doctor of Osteopathy, D.O. In rapidly increasing tempo that degree has come to denote to more and more people a well-trained physician. Government in most of its categories, from top to bottom, gives evidence of recognition of and respect for that degree and the training for which it stands.

A degree is an academic award, a recognition of the successful completion of a specified curriculum. The curriculum is set forth by the institution which grants the degree. With respect to the degrees leading to licenses to practice the healing art, lawmakers have taken a keen interest. They have, or their empowered administrative bodies have, set forth in law and regulation, and in considerable detail, the required standards to be met for those who work in the health fields.

To a large extent, those law-making bodies have turned for accreditation to two sources of authority recognized as able to evaluate the training of physicians. There are few exceptions from this assignment. They have turned to the American Medical Association to evaluate the teaching processes which produce Doctors of Medicine. With at least equal unanimity, they have turned to the American Osteopathic Association to guarantee the sufficiency of the education of Doctors of Osteopathy.

To legislators and, more immediately, to the administrative bodies which they have set up, the degree M.D. means something definite when it is issued by a school approved by the A.M.A. To those regulatory bodies the degree D.O., if issued by an institution approved by the A.O.A., means that its possessor has likewise successfully completed a curriculum guaranteed by a reliable college and a profession especially jealous for its reputation and for its good name in the world of healing.

From the beginning of osteopathy there have been those graduate osteopathic physicians who for one reason or another have obtained the degree of Doctor of Medicine, some of them in regular course in schools approved by the A.M.A. or at that time recognized by licensing bodies in some states. Some, however, obtained those degrees in schools not so recognized. The degrees from these unaccredited colleges could not be used, in most cases, as the basis of licensing, in fact, were rarely acquired with the intent of utilizing them for that purpose.

It is difficult to analyze the various factors which have motivated the acquisition of the unaccredited degree. (Incidentally, literally thousands of individuals not trained in osteopathic colleges claim to be osteopathic physicians. Only in one state do authorities disgracefully allow them to parade as such.)

However, there has been a growing opinion that the display of a diploma from an unaccredited institution, display where patients may make unwarranted inferences because of its existence, is not fair to the public. It is illegal in many states to fail to display the diploma on which a license has been issued and plainly the profession's representatives, in the House of Delegates assembled, believe such failure to display an accredited diploma is not a display of good faith with the public.

At any rate, and much more might be said on the subject and doubtless will, the amendments to the Code of Ethics, to which members of this Association subscribe, read as follows:

"It is unethical for an osteopathic physician to hold forth or to indicate possession of any degree recognized as the basis for licensure to practice the healing art unless the osteopathic physician is actually

licensed in the state in which he practices on the basis of that degree or could have been licensed at the time he received the degree or subsequently on the basis of that degree in the state where he now practices.

"It is unethical from this date for an osteopathic physician to seek to acquire or receive a degree from a school or college of the healing arts which degree is not approved by the national professional organization recognized by the United States Office of Education as representative of that school or college of the healing arts.

"It is unethical for an osteopathic physician to fail to designate or indicate by the term D.O., Doctor of Osteopathy, osteopathic physician, osteopathic physician and surgeon, or some similar term, his school of practice in the professional use of his name."

Those paragraphs are forthright, unequivocal, unmistakable in their import. We have never seen the House of Delegates quite so much in earnest about any subject which has come before it.

Last year, hospitals on the list of those approved by the Association for intern training, were asked to include an osteopathic identity in their designation. All of them did so. If ultimately a similar unanimity in designation is reached by every legitimate Doctor of Osteopathy, the favorable result to the public served, to the doctor, and to the profession will be incalculable. And in such a display of professional loyalty is the added strength needed to continue the full acceptance by society of the profession which has grown with such added vigor in the last few years.

R. C. McCaughan, D.O.

## BIOLOGIC UNITY

In the field of biologic science, the science of life, certain observations and deductions have made men realize there are inexorable laws covering biologic dynamics that are ever present. These laws cannot be abolished. Their manifestations may be modified to some degree but their existence must be taken into account whenever and wherever biologic principles are considered.

The basic unit in biology is the cell. Each cell manifests seven qualities that prepare and maintain the cell for life. They are: spontaneous movement, irritability, contractility, conductivity, constructive metabolism, growth, and reproductivity. The cell, for example, the red blood cell, that lacks or loses any of the seven qualities soon serves its purpose and is discarded or broken down to have its basic materials re-used or eliminated in the biologic economy of the structural entity.

Various factors of these seven qualities will be developed to a higher degree in accordance with the type of cell involved. A muscle cell is especially endowed with the faculties of irritability and contractility. However, all cells manifest all seven qualities.

In an organism as complex as the human body, great masses of cells have assumed special functions and these masses form an organ. Because of the complexity of these highly specialized cells, there is an interdependence and an intradependence of every cell in the body upon its neighbor and its neighbor's neighbor so that the well-being of any cell or contiguous group of cells is dependent upon the well-being of every other cell in the total structure.

In order to participate in balanced physiological and environmental activity, each cell has been given inherent selective cell intelligence. It is through this intelligence that the cell acts in balanced physiology within itself and in unison and cooperation with every other cell with which it is to reciprocate in biologic unity in the structure as a whole.

Practically all schools of the healing arts recognize the basic premises outlined above but dispute these principles in their therapeutic application to the patient that comes before them for analysis of his biologic defects and for restoration of his biologic unity.

The science of osteopathy has made the greatest strides in the total understanding of biologic unity. The osteopathic physician has at his command a clearer, more concise interpretation of the laws of biologic unity, a better method of appraisal in the presence of abnormal function, and a therapeutic approach that does more to aid in the normalization of biologic disunity than has the physician of any other school of the healing arts. It means work on his part to reach towards this understanding. It means endless study, for the science of life never reveals all of its secrets. However, the rewards for even attempting to understand are ever present.

Osteopathy, as envisioned through Andrew Taylor Still, has partially succeeded where other schools have not been as successful, because osteopathy is a philosophy. The philosophical approach to the science of life is the key that unlocks its secrets. Guard it well and use it, for only through use can advance be made.

Rollin E. Becker, D.O.

## HELP WANTED

Are you interested in making a real contribution to the osteopathic profession—a contribution which will emphasize the position of osteopathy as the leading profession in the healing arts? If so, please read the following carefully.

It is our hope, desire, and intention to present at the 1950 convention a General Sessions Program, based on careful clinical study and research, that will be outstanding in practical value. To do this, we need your help in preparing accurate and detailed records of "lesion patterns" as found in disorders of the body's systems or as found in specific diseases.

The material contributed to me by January, 1950, will be turned over to an advisory council which will select the best. The material selected will be used to formulate a program designed to demonstrate the physiological bases and pathological perversions of conditions encountered in practice, the lesion patterns found in these conditions, and the principles underlying their management. Both general and specialty

practice will be considered. Particular emphasis will be placed on the great advantage gained through the sound application of the osteopathic concept, the advantage through which the osteopathic physician leads the field.

The plan for the General Sessions Program for 1950 is to open each session with a talk on religious philosophy and osteopathic philosophy insofar as they are related in the "Art of Practice." The first 3 days of the General Sessions will be devoted to a symposium on clinical problems based on material submitted by you in response to the above request. The following 2 days will be devoted to a strictly manipulative program entitled "The Body As a Unit." An eight-man manipulative team will demonstrate normalization of the lesion patterns discussed on the preceding days. Eight men working simultaneously on the assembly floor should provide an excellent opportunity for all to view and learn these methods of corrections.

The interested and intelligent cooperation of general practitioners, specialists, and research personnel will be needed to develop this program to its fullest possibility. The material you make available will be correlated into a tremendous contribution to osteopathic thought and osteopathic literature. None of the material submitted will be wasted, for the advisory council which will review and select the material to be used for the 1950 convention program, will correlate all material submitted to be used for an osteopathic text.

YOUR cooperation is essential to the success of this program.

WILLIAM A. ELLIS, D.O.

### READING THE JOURNAL

Reading THE JOURNAL should be a regular monthly procedure of every osteopathic physician. THE JOURNAL not only contains the best of osteopathic literature, but it also carries carefully selected material reprinted from other periodicals. The fact that this reprinted material is printed on the advertising pages should not be a reason for overlooking it.

In this issue of THE JOURNAL there appears an article, "Free Medicine: What It Costs," which was originally published in *United States News & World Report*. The information found in this article will supplement the report on the Hoover Commission given by the Department of Public Relations on page 302. THE JOURNAL does not assume responsibility for statements made on the pages of other publications, but we feel that the timeliness of the subject and the general high quality of the reporting of *United States News* make this article important reading for osteopathic physicians.

### ANDREW TAYLOR STILL

On December 15, 1948, the Andrew Taylor Still Memorial Building was dedicated. On that occasion Dr. Phil R. Russell, Fort Worth, Texas, who as chairman of the Committee on Central Office Home had a significant part in the planning of the Building and in bringing the planning to fruition, spoke on "Andrew Taylor Still—Philosopher, Physician, Humanitarian." Dr. Russell's address is reproduced in full in this issue of THE JOURNAL. Thus it will be preserved for future reference and thus it is made available to those who were not privileged to attend the dedicatory ceremonies.

SPECIAL ARTICLE

# Andrew Taylor Still
# Physician—Philosopher—Humanitarian*

PHIL R. RUSSELL, D.O.
Fort Worth, Tex.

Ladies and Gentlemen: Members of the profession and friends of the profession:

I stand before you with a great deal of humility, yet with a feeling of deep gratitude for the privilege of representing some three thousand people from every state in the United States and from some foreign countries who, by their generosity, have made this occasion possible—men and women who appreciate the greatness of the science of osteopathy—who have seen many miracles from the application of its concept—men and women who wish to perpetuate the osteopathic concept of health in order that the people of the world may enjoy the benefits of its application, thereby living longer and happier lives.

In their effort to succeed in these objectives, what more fitting method could be devised than a memorial to the founder of the concept of osteopathy—Dr. Andrew Taylor Still? A memorial that is truly alive—working to help spread the truth that humanity may have the benefit of his concept of health—not just a statue, or a bit of marble for the benefit of art or the eye.

Those who conceived, financed, and built this beautiful building and memorial could find no better trustee for it than the American Osteopathic Association, whose chartered objectives are to carry out the principles and concept of health as established by the founder—Dr. Andrew Taylor Still.

This is a dedication ceremony of a memorial to Andrew Taylor Still, and would be a complete failure unless we devoted the major portion of this talk to the man to whom we dedicate this memorial, and to the theories he gave to the world. Most of you have heard these theories often, but in this fast moving world we are apt to let slip by the fundamentals and truth of his philosophy for more glamorous therapeutic applications which possibly will have passed into oblivion a decade hence.

How well I remember my first introduction to Dr. Still in 1912. I shall never forget the impression he made upon me. I like to think of that impression

*Delivered at the Dedication of the Andrew Taylor Still Memorial Building, Chicago, December 15, 1948.

along with what I have read and what I have been told by my mother who knew him so well. He was truly a great, rugged, patriotic American—physician, soldier, philosopher, and humanitarian. Above all, he was a man! He lived with people, knowing them for their greatness or their pettiness, neither despising them for their faults, nor assuming any special virtues for himself. He was a combination of physician, sociologist, and healer—seeing his patients as his responsibility, seeing their weaknesses and their problems. He knew there was no simple criterion to determine right or wrong, either for himself or for his patient. He was a man who never compromised principles for so-called success. Contained within the mind of Dr. Still were the tools required to be a truly great doctor: Research, tolerance, sympathy, and intellectual honesty. Dr. Still was a worker, a worker filled with charity, hope, and faith. To the people he gave his all. Dr. Still was a religious man; his reverence for a Supreme Power could not be challenged, for he based all of his observations upon the laws of God, creation, and nature. What more could be said of any man? Yet all of these things could be acquired by any man who desired to reach these objectives.

This memorial was not conceived because of these qualities. Yet no man without these qualities could have announced the truth which, as yet, has not been challenged, and for that we memorialize him. Let us consider the condition of the medical world at the time Dr. Still was publicly proclaiming his concepts of health. There were three distinct and quite different schools of drug medication before the public. There was ample evidence that they could not agree among themselves on what drugs were useful. Those used by one school were condemned by the others. Their air of mysticism concerning what was to be expected when a drug was administered had about run its course, and there seemed little that was definite and positive to take its place.

The efficiency of the average physician at this time was not particularly inspiring. Dr. Still was among this group of doctors, but his intellectual integrity and sincerity, which was sharpened by his grief over the loss of patients and members of his family, compelled him to turn his back upon superstition and the futilities of treating the abnormal without reasoning from cause to effect. It was then that Dr. Still proved by his research and observation that the human body contained within itself all the necessary elements to resist the onslaught of disease; that the resources and recuperative powers within the body itself were actually responsible for the cure which physicians were crediting to their own skill. Dr. Still stated that the human body was a perfect mechanism, with its ability to keep its own chemical requirements in perfect state of balance, if no structural or chemical abnormalities were introduced to distort its function. Dr. Still reasoned that order and health are inseparable; that when order in all parts of the body is found, disease cannot exist. He reasoned that if order is complete, and if disease should be found, that there is no use for order. This was the philosophy that Still gave to the world, known to you and me as osteopathy. Having arrived at a philosophy of the cause of disease, the only logical treatment was to restore order to the human body which would result in normal function and normal activity and which would overcome disease.

You must remember that this was 10 years before the laws of phagocytosis had been discovered; 30 years before Hoffmann demonstrated the Treponema pallidum; 20 years before diphtheria antitoxin was known; when the theories of acquired immunity had not been brought out; when the science of physiological chemistry, as we know it today, had not been born; when man was busy trying to find the thing to cure disease, in direct violation to the principles of Hippocrates, and was considering the disease rather than the body, we find Dr. Still reverting to the age-old doctrine, "Consider the body as well as the disease."

It was at a time when medical education was not distinct. The medical schools then in existence were of the 2-year variety. A great many doctors had received their education by the preceptor method. It was not too far from the time when surgery was done by barbers. When these facts are realized, it is not hard to go back and find out just how far advanced Dr. Still was in his thinking.

Public acclaim of Dr. Still's theories and results obtained therefrom, coupled with his inability to take care of the demands of the people, resulted in his decision to create a new type of medical school—the American School of Osteopathy to teach the first truly American philosophy of medicine—a school which was comparable in educational standards to the 2-year medical college then in existence. In securing a charter for the American School of Osteopathy, he stated that the purpose was "to improve our systems of surgery, midwifery, and treatment of general diseases . . ." Dr. Still again demonstrated his intelligence and his knowledge of human nature when he decided to grant the degree, D.O. He realized that if he granted the common and accepted degree of M.D. that his philosophy and theory of disease would be smothered by the envious and antagonistic attitude of the old type of medical school, which still clung to its mysticism and superstition, which was not based upon scientific research, and which was without a philosophy connected with its treatment. Each year since the founding of the osteopathic concept, science has added further proof of the theories adopted by Dr. Still in the early days. Metchnikoff demonstrated phagocytosis, the power of destroying micro-organisms possessed by the blood. Ehrlich demonstrated the side-chain theory of immunity. It has been proved that the body manufactures immune substances as antitoxins and agglutinins to destroy micro-organisms and their toxins. Is this not Dr. Still's philosophy demonstrated in the laboratory?

No educational group, other than that controlled by the American Medical Association, has challenged the fact that from the time of its founding the American School of Osteopathy continued in its progress and kept pace with all other medical schools. This has been equally true of the other schools that have been founded by the osteopathic profession. Yet the American Medical Association, and its cohorts, still bitterly attack the science of osteopathy. There have been numerous efforts to absorb the osteopathic profession and take over our institutions, provided we denounce osteopathy and destroy the degree, D.O., thereby sounding the death knell of the philosophy of osteopathy.

Dr. Still always said that to find health should be the object of a doctor, that anyone could find disease. Knowing and demonstrating that the normal body contains within itself the many necessary elements and the ability to resist disease, he believed that one must know and understand the normal body before he could become a good doctor. Therefore, in adopting his courses of instruction for the new school, he placed

chief emphasis on those dealing with the normal—anatomy, and more anatomy—histology, physiology, chemistry, and hygiene—knowing well that the other medical subjects, based upon the abnormal, would be readily understood by those who understood the normal. Although these courses were adequately taught, less emphasis was placed on pathology, obstetrics, surgery, and diagnosis. Abnormal and specialized diseased conditions, and their treatment were ever changing things which must still be considered as deviations from the normal physiological function.

Dr. Still believed that an intelligent doctor, if he used any degree of reason, could recognize the abnormal and that he would find the cause by detecting deviation from the normal. This was the premise upon which the Old Doctor based his treatment in the early school of osteopathy—Find the cause and remove it. When Dr. Still began to practice as a physician, drugs were administered entirely upon an empirical basis. Many of the hit-and-miss remedies and their administration stemmed more from stupid superstition than from sound pharmacology. Pharmacology, in those days, was not based upon sound research. The result of such hit-and-miss therapy was to further unbalance body chemistry and to undermine Nature in its effort to repair pathologies. The body was forced to overcome first the disease, and then the unsound treatment.

Dr. Still turned his back on these abortive remedies and began to treat the diseased body with an eye to restoring the normal—restoring to normal the structural abnormalities that he could visualize. His efforts were to correct the deviations that he could recognize in the bony structure, the ligaments, the soft tissues, and the organs of the human anatomy—to restore a normal blood supply to every organ and part of the body, for he stated that the rule of the artery is supreme, which together with proper allowance for hygienic and dietetic care, allows nature to proceed in a normal manner. The results achieved surpassed all human expectations. He not only proved, beyond all doubt, the soundness of his theories, but he improved the art and science of the practice of medicine in general, which was the avowed purpose of the first school of osteopathy and was so stated in the charter granted to operate that institution. This improvement was brought about by Dr. Still by the adoption of the age old principles of Hippocrates: "If you can do your patient no good, take care that you do no harm." This was his purpose and his dream when he yielded to the pleas of his friends and patients, who wanted him to impart his knowledge to other men and women in order that his contributions to the sick and the afflicted would not be lost to mankind.

The first school of osteopathy was founded to improve this system of medicine, mid-wifery, and surgery. Therefore, the Old Doctor did not expect this school of medicine, which he founded, to remain a static thing and fail to keep pace with the march of science. During his lifetime he saw it grow from a crude, one-room affair to include facilities for hundreds of students, with professional educational requirements of 4 years, covering more than 4,000 hours in all scientific subjects dealing with medical education, with adequate hospital facilities and equipment that was unknown in the Middle West when he trained to be a doctor.

Andrew Taylor Still never discarded those forms of treatment which had proven their merit in earlier times—whether drugs, dietetics, or surgery. His intellectual honesty would never permit him to belittle proven scientific facts, and he expected his students, and their students, to grow and develop their life or powers in newer knowledge and better technic as diseases became better understood. Dr. Still insisted and demanded proof, as all true osteopathic physicians should, that the therapy or modality used tend to restore to the body its normal structural integrity. His own attitude is best explained by one of his homely comparisons, when he said, "I have only got this squirrel by the tail—it is up to you to pull him out of the hole."

The accredited osteopathic colleges, since the days of the Old Doctor, have conscientiously taught their students to keep abreast of the proven developments in chemistry, physiology, and other allied sciences. Every new development in modality—be it drugs or surgery—has been added to the armamentarium of the osteopathic physician when it has been proven to add to the restoration of the structural integrity of the body, or to assist the body in producing its own healing substances.

The philosophy of the true osteopathic physician goes beyond the administration of treatment alone; he does not stop until he has determined why such help from drugs, or other adjunctive treatment, is needed by the body. The same is true of surgical care. Dr. Still was not opposed to surgery when the occasion demanded, though his approach to the diseased body often made it possible to avoid surgery. However, surgical care was provided for his patients under his direction, and his patients received surgical care as often and as much as wisdom found necessary to give relief or to save life or limb, when all evidence showed that the blood could not repair the injuries. There was a desire on the part of Dr. Still and of his disciples, to find out, if possible, why the pathological conditions developed in the first place. This is the philosophy Dr. Still gave to surgery, and he stated that surgery in the hands of a judicial person is of untold benefit, but in the hands of a bigot it is a deadly curse.

This was the reasoning that Dr. Still was following when he included in his therapeutic concept his statement concerning the improvement of the practice of midwifery. He did not expect to improve upon Nature, but he did work to assist the body by restoring the structural integrity, and thus removing the obstacles to a perfectly normal body function. Here, Dr. Still made one of the greatest contributions to the care of expectant mothers. Those of us who are practicing obstetrics today are derelict in our duties to those intrusted to our care, if we do not attempt to insure the structural integrity of their bodies, and thus prevent or remove the cause of those pathological conditions attributed to childbirth. This is one of the greatest trusts that Andrew Taylor Still has passed down to those of us who have come after him.

None of us have fulfilled our duty in the relationship of doctor to patient unless we find out what are the abnormalities in the integrity of the body that have allowed the process of disease to develop—what it was that started the train of events that needed drugs, chemistry, surgery, diet, or manipulation to assist Nature in getting back to normal. This is the philosophy of disease that Dr. Still handed down to us when he gave us his basic truth. Find the cause of disease and remove it. In the application of his philosophy he gave to us and to the world a scientific, mechanical

application to restore structural integrity, which neither the allopaths, nor any other school of medicine, no matter how hard they have tried under the guise of physical medicine, have been able to duplicate because they lack the philosophy behind the application.

Dr. Pugh, to you as President of the American Osteopathic Association, in the name of three thousand people who made it possible, I present the deed and the keys to this beautiful and practical memorial to Andrew Taylor Still—and I charge you, and all future officers of this great organization, with the responsibility of perpetuating Dr. Still's philosophy. Should the officers of this organization and the physicians educated under the principles of Andrew Taylor Still lose sight of the fact that human body is the temple of God, or should they, in the application of any therapy whatsoever to that body, disregard that fact, may the old prayer "Ashes to ashes and dust to dust" prevail.

602 Mid Continent Bldg.

# Department of Professional Affairs

BENJAMIN F. ADAMS, D.O.
Chairman
West Hartford, Conn.

## ADVISORY BOARD FOR OSTEOPATHIC SPECIALISTS

COLLIN BROOKE, D.O.
Chairman
St. Louis

### SPECIALTY BOARD EXAMINATIONS

*American Osteopathic Board of Dermatology and Syphilology.*—Examinations will be held in St. Louis on July 9. Applications must be received 90 days prior to examination. Address the chairman, Edwin H. Cressman, D.O., 315 South 22nd St., Philadelphia 3, Pa.

*American Osteopathic Board of Internal Medicine.*—Examinations will be held in the Fall of 1949. The latest date for filing of applications is April 1. Address the secretary, Frank R. Spencer, D.O., 40 W. Third Ave., Columbus 1, Ohio.

*American Osteopathic Board of Proctology.*—Examinations will be held on July 9 from 8:00 a.m. to 12:00 noon and from 1:00 to 5:00 p.m. Applications must be received not later than April 1. Address the secretary, Randall O. Buck, D.O., 1031 Guardian Bldg., Cleveland 14, Ohio.

*American Osteopathic Board of Surgery.*—Examinations will be held for certification in General Surgery, Orthopedic Surgery, Urological Surgery, Anesthesiology, and Peripheral Vascular Surgery on October 9-11 in Detroit. The deadline for the receipt of completed applications and supplementary data including case reports is April 1. Address the secretary, Orel F. Martin, D.O., Box 263, Coral Gables, Fla.

## BUREAU OF PROFESSIONAL EDUCATION AND COLLEGES

R. McFARLANE TILLEY, D.O.
Chairman
Brooklyn, N. Y.

### COLLEGES APPROVED BY INDIANA BOARD

On January 11 the Indiana State Board of Medical Registration and Examination approved the Chicago College of Osteopathy and the Kirksville College of Osteopathy and Surgery.

# Department of Public Relations

CHESTER D. SWOPE, D.O
Chairman
Washington, D. C.

### COMMITTEE OF HOOVER COMMISSION ASKS FEDERAL MEDICAL REFORMS

The Task Force Committee on Federal Medical Services appointed by the Commission on Organization of the Executive Branch of the Government (popularly known as the Hoover Commission) made its report to the Commission in December of 1948. The Committee report advocates numerous reforms in Federal medical services and it may be expected that the Commission will advocate most of the recommendations in its report to Congress.

The following excerpts are quoted from the authorized summary of the Committee report: ". . . In 1948 more than forty-four Federal agencies spent about one and one-quarter billion dollars for health and medical services. . . . The Federal Government now assumes a varying degree of care for some 24,000,000 persons, about one-sixth of our population. . . . A *draft* of medical personnel is needed, but it will bring in only young doctors who cannot provide high-grade specialized care. Among the non-military Federal agencies, no one has the necessary manpower. This condition is neither temporary nor self-correcting. . . . Concerning veterans with non-service connected disabilities there is an authorization to hospitalize them only if beds are 'available.' Nevertheless, 100,000 Veterans' Administration hospital beds have been built or authorized which serve no purpose except deliberately to make beds available for non-service connected cases. Most of this hospitalization could be more efficiently provided in community hospitals on a reimbursable basis. . . . For the non-military system it is recommended that a *National Bureau of Health* should be established within the Cabinet Department embracing health, education and security. . . . This Bureau should be composed of three main divisions: (1) Medical Care, which would include all functions of hospitalization and other direct medical care of patients, (2) Public Health Division, (3) Research and Training Division. . . . To the Medical Care Division of the Bureau there should be transferred the following: (1) All general hospitals of the armed services and most station hospitals except those at outlying posts, (2) The medical functions of the Veterans' Administration in toto including the out-patient service in the Regional Offices, (3) The hospitals of the Public Health Service, and, (4) St. Elizabeths Hospital. Each of the armed services should maintain one medical and teaching hospital, overseas hospitals and some station hospitals. . . . The present inconsistencies in policy between the Veterans' Administration and other federal construction programs and the non-Federal hospitals under the Hill-Burton Act should be ended. Inadequacies exist in the nation's hospital plant. The Federal Government believes that there is need for doing something about it. This policy could be furthered by placing Federal cases in *non-Federal hospitals* on a reimbursable basis wherever it is efficient to do so instead of further enlarging the Federal hospital plant. Where facilities do not exist they can be constructed on a grant-in-aid basis with much less cost to the Federal Government than by direct construction and operation. The average total cost of construction per hospital bed for private hospitals is about $16,000 whereas in Federal hospitals it is between $20,000 and $30,000. Also this would tend to

relieve the financial difficulties of private hospitals. . . . As to veterans with *non-service connected disabilities* the present situation is inequitable to veterans and unsound and expensive for the government. Such care should be furnished in those facilities, whether Federal or local, in which it can be given most efficiently. Congress should make a decision on whether medical service should be extended to all veterans irrespective of financial need or to those with non-service connected disabilities only if they are in financial need. 'In any case, there is no need for financial screening of chronic cases, as substantially all of these are soon made medical indigents by their disease. They would be a charge on the public in any event.' If Congress should adopt the second alternative a possible method would be to offer a *health insurance* plan which would include professional care. In the case of veterans unable to pay such premiums the payment would be made by the government if such inability was found to exist. Under this plan veterans who did not take out insurance themselves or for whom the government did not pay the premium would not be entitled to care for non-service connected disabilities. . . . Supervision of armed forces medical services should be in the hands of a Deputy or the Secretary of Defense. . . . Where *atomic warfare* is a potential threat it is not feasible to take medical practitioners from their home communities. To do so would imperil civilian defense. . . . The *Federal grants-in-aid* for public health have proved extremely useful. They have stimulated state and local expenditures for public health. The Federal share of such expenditures has fallen from 46 per cent in 1937 to 29 per cent in 1946. It is recommended that in the future these grants should be made on a more general basis. The Federal structure for administering grants should be simplified and decentralized with minimum supervision of the states consistent with sound planning and administration. The grants-in-aid administered by the Children's Bureau should not be transferred immediately. 'It is the view of your committee that it [the Children's Bureau] should function as a staff unit directly responsible to the secretary of the proposed department, rather than having its health and other functions split and united with the major proponent units of the Department.' In not more than three years the administration of grants for maternal and child health and crippled children should be consolidated with the other health grants-in-aid administered by the Public Health Division. . . . It is also recommended that a *National Science Foundation* should be established primarily as a means of insuring strength in the basic sciences. . . . Many *medical schools* are now in serious financial condition. Government financial aid is now an urgent necessity. Adequate facts on which to distribute such aid are not available. The Public Health Service should make a short-range survey to determine the exact needs and how they should be met. Care must be taken in granting aid to maintain the professional independence and the initiative of the schools. Also the aid should be given in such a way as to increase the output of trained personnel especially in the areas where there are acute deficiencies." (Italics supplied.)

## LABORATORY DIAGNOSIS OF MALARIA

A technical bulletin issued by the Veterans Administration under date of August 4, 1948 (TB 10-47) stresses the necessity for laboratory diagnosis of malaria before embarking on antimalarial chemotherapy. The bulletins are issued as a guide to VA personnel and fee basis physicians. The title of this particular Bulletin is "Management of Vivax Malaria in the Veteran." It deals with clinical aspects, laboratory diagnosis, and treatment.

The portion of the bulletin which deals with laboratory diagnosis is reproduced below because of the emphasis found to be necessary by the Veterans Administration in dealing with this phase of medical practice:

> The diagnosis of malaria is definitely established *only* by the demonstration of parasites in the peripheral blood, and the importance of making this demonstration before embarking upon antimalarial chemotherapy cannot be overemphasized. In relapses of vivax malaria in veterans, parasites are usually sufficiently abundant to be found readily in ordinary thin smears. These smears may be stained with Wright's stain in the usual manner and should be examined under the oil immersion lens. A great deal of improper emphasis has been placed on the time at which smears should be made in relation to the fever pattern. The correct time to make smears is when the diagnosis is suspected, regardless of the period in the cycle of the parasite or the time in relation to the paroxysm. Needless time is often lost in waiting for the next paroxysm before smears are made. In fact, the height of the paroxysm in a well-developed infection is the poorest time to make smears, since at that time the parasites are smaller and not as well established in relation to red cells as at other times in the cycle. In the case of primary attacks, the density of parasites may be so low that one or more thin smears will be negative even after careful search. In these cases, however, thick drop examinations often disclose parasites. For this reason it is a good practice to make thick and thin smears at the same time and, if the latter are negative, the thick smears can be examined in a laboratory or by personnel trained in the thick drop technique. If facilities for such studies are not available, thin smears should be obtained at 8 to 12-hour intervals for at least several days. In some cases, even the first thick drop may be negative, and the same procedure of multiple examination for several days should be followed. Wherever possible, exact identification of the parasite should be established. In the latter connection, it may be pointed out that quartan *(P. malariae)* malaria occurred very rarely in the army, and that *P. falciparum* is almost never found from 3 to 6 months after the last exposure or primary attack if the patient has been adequately treated. Reference of smears for species identification in doubtful cases to nearby medical school, county, State or Federal laboratories is a helpful measure if VA facilities are inadequate.
>
> Another misconception in regard to the laboratory diagnosis of malaria is the use of adrenalin. There is no convincing evidence that injections of adrenalin significantly affect the parasite density in the peripheral blood. Time spent in the examination of numerous smears after injections of adrenalin could be more profitably employed in the examination of thick drop preparations and in repeated examination of smears collected at 8 to 12-hour intervals for several days. Complement-fixation, precipitin, or other serologic tests, are of no value in correlating a current acute illness with malaria infection. The presence or absence of malaria parasites in the blood is the crucial factor in the diagnosis.

## INFLUENZA INFORMATION CENTER

A plan which seeks to prevent recurrence in this country of a serious epidemic of influenza like that which occurred in 1918 has been developed by the Surgeons General of the Army, Navy, Air Force, and Public Health Service.

The plan is part of an international program set up by the World Health Organization last year to study influenza and aid physicians and health officials in the control of the disease. An Influenza Information Center to serve as headquarters for the program in the United States has been established at the National Institutes of Health, Bethesda, Maryland.

The specific objectives of the worldwide program are (1) to identify new strains of influenza virus as these appear and (2) to evaluate their usefulness for incorporation in influenza vaccine.

Prompt reporting by local physicians and health officers of all suspected cases of influenza is essential to the success of the program, because of the explosive character of most influenza epidemics and their exceedingly rapid spread over extensive areas. In the past, many cases of influenza have not been reported to health departments until outbreaks had already attained comparatively serious proportions. The laboratory identification of suspected cases has seldom been obtained, and reported outbreaks of the disease in most instances could not be authoritatively described as caused by influenza virus.

The program will operate as follows in the United States:

As soon as a significant outbreak of respiratory disease suspected to be influenza has been reported in a given community, the Influenza Information Center will alert diagnostic laboratories in the region, asking them to carry out serological tests on patients for the presence of antibodies against the influenza virus. Certain laboratories will also be asked to assign to the affected community a team of investigators experienced in the technics of isolating the virus.

As soon as these investigators have isolated a new strain of virus, they will send it at once for a complete antigenic analysis to the Strain Study Center of the Influenza Commission, Army Epidemiological Board, at Long Island College of Medicine, Brooklyn, New York. Appropriate strains of the virus which have been isolated will be considered for possible inclusion in commercial vaccine.

Officials have pointed out that cooperation of all diagnostic laboratories in the nation is being sought. However, a number of laboratories believed to be especially qualified because of

their strategic location or their personnel have been formally invited to participate in the program. Fifty-six have already accepted this invitation.

### MENTAL HEALTH

Forty-two medical schools in the United States are to receive Federal funds totalling $1,498,333 for developing or expanding training in psychiatry for undergraduate medical students. The first funds will be made available for the school year 1949-50, and will be paid in annual allotments over a 3-year period.

Upon the recommendation of the National Advisory Mental Health Council, at its recent meeting in Washington on December 12 and 13, the Surgeon General of the Public Health Service, Dr. Leonard A. Scheele, approved the applications of the forty-two medical schools.

The size of each grant was determined by prorating the requirements of the school against the funds appropriated for the purpose under the National Mental Health Act.

Dr. Scheele expressed the hope that all eligible schools would eventually be awarded grants for this development in undergraduate medical training. The money will be available in July, 1949.

The program making psychiatric training available to undergraduate medical students was developed as a result of representations by health authorities that all physicians need to be familiar with the effect of the emotions on the general health of the individual. In addition, these authorities have stated that the family doctor, the heart specialist, the pediatrician, and all doctors should be trained to recognize the signs of incipient mental disturbances. As preventive medicine, it was pointed out, the importance of treating a mental condition before it becomes a serious problem is similar to that of diagnosing and treating tuberculosis or cancer in the early stages.

### COMMITTEE TO EVALUATE PUBLIC HEALTH SERVICE PROGRAMS

Appointment of a committee to evaluate the effects of Public Health Service programs of research and educational grants on medical education has been recommended by the National Advisory Health Council, Surgeon General Leonard A. Scheele of the Public Health Service, Federal Security Agency, announced November 4.

The fourteen-member National Advisory Health Council was established by law to advise the Surgeon General and make recommendations on matters relating to health activities and functions of the Service.

In commenting on the action of the Council, Federal Security Administrator Oscar R. Ewing pointed out that the proposed study will make available information essential to resolving the problems confronting medical education and will form a part of the current Agency-wide studies of the entire field of higher education in which the Office of Education is participating.

The committee will be appointed in the near future, the Surgeon General announced. It will include representatives of advisory councils to the Public Health Service, medical education institutions, professional organizations, and the public.

"The evaluation proposed by the Council should be of inestimable value in appraising the impact of Public Health Service programs of research and educational grants on medical education generally, and in charting the direction and development of such aid in order that the fullest benefit may accrue to the Nation's health," Doctor Scheele stated.

## Current Medical Literature

### CONDITIONS COMMONLY MISTAKEN FOR CORONARY OCCLUSION AND ANGINA PECTORIS

Howard B. Sprague, M.D., reproduces the Bill of Mortality from the town of Portsmouth, N.H., in the *American Practitioner,* December 1948, and calls attention to the fact that not one of the 6,000 inhabitants of that town 144 years ago died of heart disease or cancer. In Brookline, Mass., the word "coronary" did not appear on a single death certificate in the period 1900-1904; in 1905-1909 coronary disease was listed as the cause of death in 3.9 per 100,000; by 1935 there had been a forty-fold increase in this listing. There has probably been some increase in coronary artery disease in the United States, but the tremendous reported incidence is due both to better diagnosis and to popularity of the terminology. What in earlier years must have been coronary artery disease was then called something else, but what is now something else must, at least sometimes, be called coronary disease. However, serial electrocardiography has made possible more accurate diagnosis of myocardial infarction and hence elimination of many conditions previously confused with coronary artery disease.

A functionally balanced coronary circulation may, in the presence of significant coronary atherosclerosis, be thrown out of equilibrium by anything increasing the demands on the myocardium or decreasing the coronary blood supply beyond critical levels. Great diagnostic difficulties arise when nonspecific electrocardiographic changes occur from acute alterations of this equilibrium associated with changes attributable to coronary disease itself, with more or less myocardial infarction or ischemia. Among such conditions are pulmonary embolism, acute pericarditis, dissecting aortic aneurysm, ectopic cardiac rhythms, and cerebrovascular attacks.

A careful history is more important than any test in diagnosis of angina pectoris or any other degree of coronary insufficiency too slight to produce electric disturbances in heart muscle. In such cases the clinician must, if possible, determine the amount of heart damage attributable to coronary disease and that due to temporary acute conditions, such as pulmonary embolism, hemorrhage, overexertion, abnormal rhythm, anoxia, or other disturbance of coronary equilibrium. The greater the strain on the circulation, the less the underlying coronary disease that need be predicated when the electrocardiogram indicates myocardial anoxia.

### EPILEPSY IN CHILDHOOD: NEWER METHODS OF DIAGNOSIS AND TREATMENT

M. G. Peterman, M.D., states in the *Journal of the American Medical Association,* December 4, 1948, that recent publicity to the general public concerning diagnosis and treatment of epilepsy has led parents in search of some miraculous treatment for epileptic children to cherish false hopes and to become dissatisfied with usually adequate treatment or the best treatment available. The physician's first duty to the parents and to the public is to give an honest statement of the facts in a given case and a frank presentation of the prognosis. Even if epilepsy should eventually become one of the curable diseases, it is not yet in that class; spontaneous regression of petit mal epilepsy in children is so rare, however, that steps should be taken early to keep the disease under control.

Enough is now known about convulsions in childhood to make possible the diagnosis of epilepsy by exclusion. Hence every child with a convulsive disorder should have the most thorough study possible, including a carefully taken history; laboratory procedures should include determinations of blood sugar, calcium, and phosphorus. Whenever possible electrocardiograms should be made, preferably sleep recordings, to establish the diagnosis and determine the type of epilepsy.

The most effective treatment for all types of idiopathic epilepsy is the ketogenic diet (based on work by an osteopathic physician, Dr. Hugh W. Conklin, Battle Creek, Mich.), which is capable of controlling 50 per cent of all childhood epilepsies. Drug ketosis is not effective. In fact, all drug treatment of epilepsy is symptomatic and should not be considered unless the ketogenic diet is impracticable or impossible. Recent studies indicate that glycerin may reinforce the ketogenic diet.

Drug treatment is, at best, a temporization with a chronic hereditary disease, and if it must be used it may necessitate

lifetime ingestion of anti-convulsants. The most effective agents for petit mal seizures seem to be thyphenytoin (sodium 5,5-phenylthienyl hydantoin), paradione (3,5-dimethyl-5-enhly-oxazolidine-2,4-dione) and tridione (trimethadione). Only the first of these will be of help in control of grand mal; the others must be supplemented with phenobarbital to prevent major attacks. Phenobarbital is the most effective and least expensive drug for control of major seizures; it is universally available and produces the lowest number of undesirable side-effects. All anticonvulsants should be given throughout the 24 hours.

Epilepsy, like diabetes, is a chronic inherited disease which is present even before the child is born. Conditions during his life may be such that clinical manifestations will not develop, but he may transmit the defective gene. Hence the only hope of eliminating the disease lies in eugenics.

### MISUSE OF INSULIN IN THE DIABETIC SYNDROME

When a physician finds that a patient has excess glucose in transport to tissues and organs, he has a tendency to assume that the pancreas is at fault, whereas the cause may be disturbed peripheral utilization of glucose, overproduction of glucose or both. However, since insulin is useful in all types of hyperglycemia, regardless of cause, and is, in fact, the only antidiabetic agent available for therapeutic use, he is likely to prescribe it without proper search for the real cause of the diabetic syndrome. Herbert Schreier, M.D., and Elmer L. Sevringhaus, M.D., call attention in the *New York State Journal of Medicine*, December 1, 1948, to the fact that insulin therapy is frequently ill advised, particularly for older patients. They report 9 cases in which hyperglycemia in older and/or obese patients was controlled without insulin.

There are three chief reasons for caution in administering insulin to older diabetic patients: (1) to prevent obesity, which puts a strain on the cardiovascular system in addition to the metabolic strain; (2) to prevent fall of blood sugar to such low levels that insulin shock may develop; and (3) to prevent stenocardia and coronary insufficiency. In such patients and in obese patients of any age group, insulin therapy should not be instituted until dietary measures have been tried and the various diabetogenic factors investigated. The authors do not recommend that patients already receiving insulin be suddenly taken off that form of therapy; instead, these patients should be hospitalized for observation to prevent precipitation of diabetic acidosis (some with severe diabetes would go into acidosis immediately on withdrawal of insulin). All persons who are to be taken off insulin or whose insulin dosage is to be considerably reduced should be cautioned to be on the alert for acetone in the urine, in order that insulin therapy may be instituted immediately to prevent acidosis and coma.

### CONSERVATIVE TREATMENT OF SCOLIOSIS IN SELECTED CASES

Col. E. M. Smith and Lieut. Col. C. D. Shields state in the *Archives of Physical Medicine*, November, 1948, that scoliosis without structural bone changes should theoretically yield to correction when a balance is re-established between the structures of the back and the demands that are made on them. They describe a brace which, together with intelligently applied therapeutic exercises, will produce correction in certain cases and will halt progression of the condition in others.

Scoliosis is not uncommon, and in about 80 per cent of cases no definite cause for the condition can be established. It occurs early, and it is most important that it be discovered and treated early, before vertebral growth is complete, about age 14 in girls and 16 in boys. If it is not accompanied with structural changes in the bones, it should be treated conservatively, with a program of muscle grading, application of a brace, and development of muscles by a planned continuous program of exercises adapted to the patient's fatigue tolerance and his muscular reserve capacity; use of the brace should be gradually dispensed with during the program.

The brace is used to exert a direct flexible pressure to assist in restoring and maintaining a normal spinal posture. It was designed by the authors as an improvement of the Magnuson type brace. It differs principally in having movable, rather than fixed, joints. A hip saddle built along both sides of the lower bar conforms to the contours of the hips, and there are two adjustable pressure pads on the sides of the brace to exert direct pressure on the sites of greatest deformity. Flexible pressure is controlled by a spring scale which exerts force through the medium of cables strung through lateral pulleys.

This type of conservative therapy is also applicable in cases in which spinal fusion is contemplated, to develop the greatest possible preoperative compensation of the spine and to maintain postoperatively the results accomplished operatively.

### AUREOMYCIN THERAPY IN HUMAN BRUCELLOSIS DUE TO BRUCELLA MELITENSIS

In the *Journal of the American Medical Association*, December 18, 1948, Wesley W. Spink, M.D., and others report results in aureomycin treatment of 24 patients with brucellosis infections due to Brucella melitensis, infections which are notoriously malignant. The patients, 16 female and 8 male, ranged in age from 4 to 54 years and had had the disease for periods ranging from a few days to a year. Brucella melitensis had been cultured from the blood at least once in each case. Some of the patients were so ill that hospitalization was required, and one was in such critical condition that little hope was entertained for her recovery. Six of the patients had been previously treated with streptomycin and sulfadiazine. Thirteen were treated on an ambulatory basis.

Laboratory studies had indicated that aureomycin is less effective in vitro against brucella organisms than is streptomycin; hence, since it was the original plan to use aureomycin as a substitute for streptomycin, the first 16 patients were given both aureomycin and sulfadiazine. It soon became apparent, however, that extremely favorable therapeutic results were being obtained, and the last 8 patients received only aureomycin, with equally good results.

Prompt improvement occurred in every case. The temperature usually became normal within a few days after the start of therapy, and in most cases blood cultures became and remained sterile. Aside from "Herxheimer-like" reactions which occurred when the intitial dosage exceeded 0.5 gram every 6 hours, the only side-effects pertained to the gastrointestinal tract (nausea, vomiting, and mild diarrhea), but these were not of a severity to warrant suspension of therapy.

The recommended dosage schedule provides for a total of 0.1 gram on the first day (in four divided doses by mouth), 0.6 gram on the second day, 1.6 grams on the third day, and 2 grams a day for 7 more days.

Follow-up studies several months after termination of therapy (reported in an addendum) indicated that the foregoing schedule did not prevent bacteriologic relapse. Hence the authors now recommend a total daily dose of 4 to 6 grams for 2 weeks, instead of a 2 gram daily dose for 10 days. (Because of the fact that febrile reactions associated with a drop in blood pressure occurred when too large initial doses were given, it would still seem wise not to give too much on the first day.)

### A METHOD OF REPAIR FOR A COMMON TYPE OF TRAUMATIC INCONTINENCE OF THE ANAL SPHINCTER

Walter Birnbaum, M.D., writing in *Surgery, Gynecology and Obstetrics*, December, 1948, describes a method of repairing defects in the anal sphincter which has features which tend to overcome some of the factors leading to failure with methods previously used.

Two factors are involved in the production of anal incontinence. The first is an actual increase in the circumference of the anus, resulting from loss of muscle, producing an orifice so large that the muscle cannot close it when it contracts. The second is scar tissue in the muscle creating a sulcus which interrupts the normal contour of the anal periphery; the epithelium covering the scar forms a smooth trough through which feces and secretion escape. The "classic repair" of the sphincter muscle consists in dissecting out the scar tissue and reapposing the retracted muscle ends, but with this method the sutures, which are placed in poorly holding

muscle, may not appose the dissected edges for a sufficient length of time for them to unite firmly; furthermore, the trauma imposed on the muscle during the operation may result in further extension of the scar tissue in the muscle.

Birnbaum's method, which is suitable for cases in which a relatively small segment of muscle is lost (but which can be modified for use with larger defects), is based on Bunnell's principle of "suturing at a distance" with steel alloy wire. It necessitates minimal dissection, converts the ditchlike defect into an elevation simulating the normal contour of the anus, obviates strangulating retention sutures, and provides sufficient suture traction in the proper direction.

The patient is prepared preoperatively with nonabsorbable sulfonamide drugs by mouth, cleansing enemas, and nonresidual diet. Transsacral anesthesia is preferable, and the operation is performed with the patient in the prone position and the table jackknifed. The anal canal is packed with antiseptic-saturated gauze and carefully draped out of the operative field. A crescentic incision, just lateral to and centered over the defect, is carried down to the desired level and excessive scar removed en bloc. Dissection is not carried back to normal muscle; enough scar tissue is left at the muscle ends to permit placing sutures firmly in it. No. 34 steel alloy wire sutures, passed through the loops of "pull-out" wires, are laid in such a way that they exert a pull tangential to the circumference of the sphincter muscle; thus the one end of the muscle to be apposed is held in direct line with its fellow, which, in turn, is fixed in the same manner. The "pull-out" suture is looped through the end of the holding suture and brought out through the skin with both of its ends threaded through the eye of a single needle to bring them out through a single opening in the skin. The holding sutures are then drawn up enough to convert the longitudinal wound into a transverse one, and the defect is closed in layers, preferably with fine interrupted cotton sutures, without tension. The retention sutures are secured to the skin surface with buttons (under which are several layers of gauze to prevent pressure ischemia of the skin) and tightened. After operation it will be noted that the sulcus in the scar between the divided muscle ends has become a fold invaginating itself into the anus, thus restoring the normal corrugations. Bowel movements are not permitted for at least 7 days; the sutures are removed at the end of 14 days.

Birnbaum reports good results in three cases.

### EARLY AMBULATION IN SURGICAL CONVALESCENCE

Although early ambulation is again being empirically accepted as a postoperative therapeutic measure, little is known of the physiology of many of the body changes induced by it and the mechanism of its effectiveness is still unexplained. Nathaniel Glickman, M.S., Robert W. Keeton, M.D., and others, writing in the *Archives of Physical Medicine*, December, 1948, report on an extensive experiment, the purpose of which was to develop methods and objective criteria for estimating progress in surgical convalescence and applying these criteria to a study of the influence of early ambulation and dietary modifications in altering the speed of convalescence. Many of the data have been reported elsewhere; hence the present report is an evaluation of the therapeutic effects of early ambulation on patients (chiefly young men, average age 26.6 years) who had undergone herniorrhaphy. The patients were grouped into paired groups, one of which was allowed out of bed on the first postoperative day and discharged on the seventh day. Most of the nonambulated groups were kept in bed until the sixth postoperative day and discharged on the seventh day; one group was kept in bed until the tenth day and discharged on the twelfth postoperative day; another group, likewise kept in bed for 10 days, received a form of modified ambulation. Various dietary modifications were made, and the patients underwent various tests.

Among the conclusions were the following: Early ambulation did not decrease liver impairment commonly noted after anesthesia and operation except in a group which was tube fed and received a high protein diet in addition to early ambulation. Negative nitrogen balance occurred in patients receiving submaintenance calories during the first few postoperative days, but early ambulation partially reduced the extent of the negative balance. Positive nitrogen balance was maintained by feeding a high protein diet by tube, and early ambulation increased the extent of the positive balance. The effects of early ambulation on nitrogen balance were due to decreased nitrogen excretion in the ambulated groups. Early ambulation reduced the postoperative weight loss. Nonambulated patients showed impaired performance postoperatively on tilt-table tests, whereas ambulated patients had little impairment or improved scores postoperatively. Postoperative performance of ambulated patients on push-up tests was as good as, or better than, preoperative performance (early use of this type of exercise may provide relief from gas pains). Patients receiving early ambulation needed significantly less sedation on the first postoperative day, had earlier bowel movements without the aid of enemas, and appeared to have better appetites than did nonambulated patients. There was no recurrence of hernia 2½ to 3½ years after operation in the 17 patients re-examined out of the 26 who had received early or modified ambulation, whereas there were 2 recurrences in the 34 re-examined patients from the group of 54 who were not ambulated.

### THE COMMON COLD: TITRATION OF MR-1 VIRUS IN EMBRYONATED EGGS

Leon T. Atlas and George A. Hottle describe in *Science*, December 31, 1948, a method for titrating MR-1 virus (capable of producing colds in human volunteers) in embryonated eggs to replace the only method previously available for measuring amounts of cold virus, human inoculation. The method is based on the fact that nucleic acid is common to all viruses and that the components of this acid can be determined with a tryptophane-perchloric acid (TPA) procedure. The authors have developed an adequate method for freeing the allantoic fluids used in the test from substances that interfere with color formation by the reagents.

The virus-containing material is inoculated into 6-day old embryonated eggs, which are then incubated at 36 C. for 7 days; the allantoic fluid is then harvested, precipitated with methyl alcohol, the precipitate resuspended in distilled water, and reprecipitated with calcium acetate solution. This precipitate is treated with racemic tryptophane and perchloric acid and the TPA values obtained by determining the optical density in the Beckman spectrophotometer. Positive TPA values indicate multiplication of the virus. Individual fluids with negative values did not produce symptoms in human volunteers and showed no growth by titration in individual eggs, whereas fluids with positive TPA values produced severe colds in human volunteers and produced high virus titers in eggs.

The exact nature of the substance producing the TPA values is now being investigated.

### ALLERGIC FACTORS IN GOUT

Joseph Harkavy, M.D., states in the *Journal of the American Medical Association*, January 8, 1949, that the fact that gout is frequently referred to as a forgotten disease suggests that it is frequently overlooked. In a recently reported series of cases approximately 15 years had elapsed between the first attack and the correct diagnosis. Although most of the patients are men, women and even children are occasionally affected. The disease involves a defect in purine metabolism, but it is not definitely known whether the acute attacks are due directly to this defect or whether the defect predisposes the patient to the action of other factors.

It is generally known that gouty attacks may be precipitated in certain persons by a variety of factors—foods, alcohol, overindulgence in fats, surgical operations, various drugs, insulin, liver given parenterally, disturbances in water and electrolyte balance, trauma, and exposure to cold or dampness. The mode of action of these agents is not clear. The author reports 3 cases in which it was possible to demonstrate that allergy to specific foods and pollens and to infections played an important part in the development of the gouty attacks associated with hyperuricemia. In each patient attacks could be induced by subcutaneous injection of several pollen extracts at the same time or by the combined action of allergenic

foods and pollens. In 1 patient, injection of pollen produced kidney manifestations, characterized by temporary urinary suppression and albuminuria, in addition to the joint symptoms. In another, an overdose of pollen was followed by a response in nasal and pulmonary structures as well as joints, suggesting that the swelling of the gouty arthritis and the renal and respiratory manifestations in these patients resulted from vascular tissue reactions mediated by similar allergic mechanisms. In these cases, therapy was both symptomatic—administration of colchicine and local injections of epinephrine—and causal—elimination of offending foods and pollen immunization.

It is concluded that inasmuch as a disturbed purine metabolism usually accompanies gout, the gouty person may be regarded as a potentially allergic person whose joints constitute the major shock tissue with a coincidental uric acid diathesis. The crippling arthritis of the tophaceous stage may be the sequela of repeated minor allergenic insults. The ensuing local complications may, in turn, be due to irritating effects of the urate deposits.

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### COMPLICATIONS AND PRECAUTIONS IN BLOOD TRANSFUSION THERAPY

Blood transfusion therapy has become popular both because of its demonstrated value and because of the increased knowledge of all aspects of this form of therapy, which has in general kept transfusion reactions at a minimum. E. E. Muirhead, M.D., and J. M. Hill, M.D., writing in the *American Practitioner,* January, 1949, point out that the possibility of serious reactions is still real and must be kept in mind by the physician, although such complications are becoming rarer and rarer and the frequency of certain ones is very low. They discuss eight different types of complications (or reactions).

Pyrogenic reactions have certain characteristic features: a sudden chill occurring during or within an hour after the transfusion, followed by a sharp temperature rise, elevated pulse rate, and subjective complaints of varying intensity. Generally the fever disappears within 6 hours and is followed by a number of hours of slight hypothermia; in most cases there are no subsequent sequelae, but at times the complications are severer. The specific causes are only partly understood; the general term "pyrogen" is applied to any substance eliciting such a reaction. Frequently the pyrogen is a product of bacterial invasion. Minor incompatibilities may play a role. Prevention of pyrogenic reactions due to bacterial proteins consists in close adherence to "pyrogen-free" technics throughout all phases of preparation of equipment and collection and administration of the blood. Coomb's test may give helpful information in cases of suspected minor incompatability. Treatment is mostly symptomatic: administration of sedatives or analgesics as needed.

Of allergic reactions, the urticarial is the commoner. It is characterized by erythema, itching, edema, wheals, etc. The asthmatic response is more serious but rather rare. Allergic reactions seems to appear more frequently after transfusions of blood than of plasma. If the patient has a history of severe asthma or urticaria, he should be watched closely for reactions. It has been suggested that allergic reactions can be minimized by collecting blood from fasting donors, but the question is still open. There are some indications that use of antihistaminic drugs (such as 50 mg. of benadryl 30 minutes before transfusion) minimizes or eliminates this type of response. After the reaction has appeared, the usual therapeutic measures are applied.

The other types of reaction are extremely rare; these include hemolytic or incompatible reactions, citrate reactions, circulatory overload, potassium overload, iron overload, and pulmonary embolism. The hemolytic reaction is generally considered the most serious type because of the high mortality rate when renal insufficiency develops; however, the mortality seems to have been related to the management of the patients. The reaction is characterized by three phases. The first, the hypotension phase, is combated by administration of more blood or a colloidal solution (in this case care must be taken not to dilute the circulating red cells too much). The second, renal insufficiency, stage is managed by control of fluid intake and administration of sodium bicarbonate to prevent advanced acidosis. In the third, diuresis, stage management consists in replacement of the water and salt lost in the urine.

Circulatory overload can be corrected by withdrawal of blood. The citrate reaction may be combated with calcium chloride intravenously for the acute phase and calcium gluconate intravenously or intramuscularly for the subsequent course. Potassium overload manifests itself by varying grades of heart block, cyanosis, weak pulse, and low blood pressure. Treatment consists in intravenous administration of sodium chloride solutions or oral ingestion of sodium bicarbonate to decrease the potassium concentration of the extracellular fluid.

Patients with refractory anemias, aplastic anemia, etc., who may have to be maintained on repeated blood transfusions may accumulate an overload of iron in the tissues. This is a type of reaction that can hardly be prevented, but it should be borne in mind when maintenance of such patients indefinitely by blood transfusions must be evaluated.

Fibrin and gel-like masses may pass through a transfusion needle and become emboli that are arrested in the lungs. Rare fatalities considered due to this complication have been reported after use of citrated plasma. A fine mesh filter must always be included in the transfusion apparatus.

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### THE DIFFERENTIAL DIAGNOSIS OF POLIOMYELITIS

Since there still seems to be no prophylaxis against poliomyelitis, the physician can only treat the patient; but, before he can do this effectively, he must be able to recognize this disease and exclude others. The final evidence of bacterial infection is demonstration of the causative organism, but the technical difficulties involved in demonstration of a virus are so great that the diagnosis of a virus disease, such as poliomyelitis, must generally rest on less specific evidence. This less specific evidence is discussed by Henry W. Woltman, M.D., in the *Illinois Medical Journal,* November, 1948.

Complete diagnosis must be concerned with the disease from onset to residua—i. e., in the preparalytic and paralytic periods and after the disease has run its course. The preparalytic period is crucial, since the public must be protected and the patient must receive prompt care. The patient's life is menaced, and every hint of acute infection and of nervous system involvement must be regarded seriously. The danger in this period lies more in failure to make a complete, head to foot examination than in lack of knowledge of poliomyelitis, meningitis, myelitis, and encephalitis, the chief diseases to be considered in differential diagnosis at this stage.

When it is evident that the patient's muscles are becoming paralyzed, the following diseases must be differentiated: epidemic parotitis, carcinomatous meningoradiculitis, periarteritis nodosa, neuronitis, diphtheritic neuritis, porphyric neuritis, Landry's paralysis, botulism, tick paralysis, triorthocresyl phosphate poisoning ("jake paralysis"), polyneuritis recurrens, familial periodic paralysis, hyperthyroid crisis, brain tumor, and hysterical paralysis. Generally the signs of epidemic parotitis that may simulate those of poliomyelitis appear with or shortly after swelling of a parotid gland or testis, but occasionally they precede the mumps or orchitis. The presence of an epidemic usually makes possible the differentiation. Generally in epidemic parotitis with nervous system involvement, the spinal fluid is under increased pressure and the cell count is high. Carcinomatous meningoradiculitis may produce a picture of rapidly advancing paralysis; fever may be present, and sensory changes may be minimal. In the presence of malignant metastases the spinal fluid protein is often considerably increased, and lymphocytes, neutrophils, and malignant cells may be found. When paralysis appears in a patient with periarteritis nodosa, he has usually been ill for some time (but in some cases paralysis occurs early) and the disease has been advancing episodically in different locations. Leukocytosis occurs in about a third of the cases, but eosinophilia, a strong indication of periarteritis nodosa when present, occurs in only about an eighth of the cases. The diagnosis may also be made from biopsy of an inflamed structure. The muscle weakness of neuronitis tends to be diffuse and symmetrical,

whereas that of poliomyelitis is often insular and asymmetrical; if there is sensory loss it is a distinctive bit of evidence in favor of neuronitis. Extremely high spinal fluid protein is fairly constant. Generally diphtheritic neuritis can be diagnosed from the palatal paralysis preceding the paralysis of the extremities and the identification of Corynebacterium diphtheriae in faucial secretions. Acute porphyric neuritis can be diagnosed from the history of passing reddish or brownish urine and the pinkish fluorescence of uroporphyrin under ultraviolet rays. Tick paralysis can be easily overlooked, since the bite is usually painless. The paralysis is progressive, usually extending from the lower extremities upward. The tick can generally be found somewhere along the spinal column, frequently at the hair line, and after removal of the tick recovery usually occurs within a few days.

The diagnosis of poliomyelitis must sometimes be made in retrospect. In such a case differential diagnosis is facilitated by noting that the atrophied muscles of poliomyelitis are often situated asymmetrically.

## COHESIVE BANDAGE FOR CLUBFOOT IN NEWBORN INFANTS

Emil D. W. Hauser, M.D., writing in the *Journal of the American Medical Association*, September 4, 1948, describes the use of a cohesive bandage—i. e., one which will stick to itself but not to the skin—which can be applied immediately after birth to provide the earliest possible correction of talipes equinovarus. The author recognizes two types of deformity: (1) that resulting from retention of an intrauterine position, and (2) a true anomalous congenital type often associated with other deformities. In both types the heel is in the varus position, the anterior part of the foot is adducted and supinated, and the foot is plantar-flexed in the equinus position; there is imbalance between powers of the muscle groups, the inverters being stronger than the everters. Correction consists in restoring normal position and establishing normal muscle balance; it is not complete, no matter how well the foot looks, until the foot can be voluntarily brought into eversion. The technic consists essentially of overcorrection of the varus deformity by bandaging the foot in the maximal amount of valgus position with the cohesive bandage, and of correction of the position of the anterior part of the foot by bandaging it in abduction and pronation. To provide adequate resistance to the constantly contracting muscles, the cohesive bandage is reinforced with waterproof adhesive tape. Bandages are changed frequently, but the overcorrected position must be retained until the child walks. Braces, occasionally casts, and surgical correction may be needed to assure correct gait.

Hauser reports encouraging results in 70 cases.

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In a subsequent issue of the *Journal of the American Medical Association* (November 27, 1948), both Don H. O'Donoghue, M.D., and Edward Parnall, M.D., object to statements made by Dr. Hauser in the original implying that because of difficulties in plaster technic, correction of clubfoot is generally delayed until the child is about 3 months old. Both physicians state that application of plaster is usually begun much earlier than stated by Dr. Hauser, within the first few days after birth. Dr. Parnall quotes Dr. Frank Ober as replying in answer to a student who wished to know when correction of a clubfoot should be begun, "If it is a breech, you wait until the head's delivered."

## THREE MONTHS OF FULL-TIME GRADUATE COURSES

The Philadelphia College of Osteopathy has announced its Spring 1949 Courses for Graduates. These courses extend over 3 months, from April 4, 1949, to July 1, 1949, and they offer a wide selection of subjects to graduates interested in osteopathic medicine. One can choose from any of ten courses. There is something for everyone, whether he is interested in a general review or in the most intricate details of specialty subjects.

The month of April will be devoted to Osteopathic Medicine. This course, which is a general survey of all branches, will again be given in four parts of 1 week each. This division of subjects was popular with many in last year's class for it permitted them to plan short, full-time courses in the subjects of their greatest interest. The general arrangement will be the same as in 1948, with lectures, demonstrations, clinics, and moving pictures illustrative of the subjects under consideration. Visiting lecturers and guest faculty will again present this comprehensive course.

Physical Diagnosis for the graduate is a new offering this year. It is designed for any physician or surgeon who wishes to refresh his knowledge and perfect his skill in this basic art. The course will be practical and will consist of basic anatomy as well as actual laboratory work. There is always a need for a review course in physical diagnosis and the limited enrollment of this class should fill quickly.

The courses in Cardiovascular Diseases (Fundamentals) and Cardiovascular Diseases (Laboratory and Clinical) were oversubscribed in 1948. This year, better facilities and an enlarged resident and guest faculty make it possible to accommodate sixteen in the first, and eight in the second of these offerings. Additional hours and more projections of electrocardiographs are scheduled. Cardiology is always popular, so in addition to the above courses, Pediatrics Cardiology has been scheduled this year. This new course will include electrocardiography in children and a review of heart surgery. It should be as popular with those interested in children's disease as with the physicians interested in heart disease.

The class in electrocardiography will attend upon the hours devoted to interpretations in children, for it will be given by an expert from New York City. Electrocardiography is planned for those who are now using an electrocardiograph; it is not paced for general practitioners or for beginners. Much of the time will be devoted to the projection of all types of electrocardiograms derived by all practical technics. Discussion of actual cases will be integrated with the lectures in this advanced course.

The Intensive Review Course is planned to cross-section all fields of practice. There will be symposia, clinics, demonstrations of technics, and moving pictures on subjects of current interest to every doctor. The course is devised to bring up-to-date the physician's information in the various branches of practice. This is an ideal fortnight course for the alert, conscientious general practitioner who wishes to learn the newer methods and to review the established principles of practice.

Supplementing the resident faculty in the various courses will be an adjunctive faculty of distinguished osteopathic internists including Dr. H. Earle Beasley of Boston, Dr. Earl E. Congdon of Flint, Mich., Dr. Ralph E. Everal of Detroit, Dr. Frank R. Spencer of Columbus, Ohio, and Dr. Charles M. Worrell of Palmyra, Pa. These men have been engaged because of their special qualifications in certain parts of osteopathic internal medicine. In order that broad and diversified instruction may be available, nationally known M. D. specialists in hematology, peripheral vascular diseases, and special electrocardiography will present these subjects. Basic science will be given by university professors.

Information on the complete curriculum will be available about February 10; the college will furnish it to applicants.

RALPH L. FISCHER, D.O.

## AMERICAN OSTEOPATHIC SOCIETY OF PROCTOLOGY CONVENTION

The American Osteopathic Society of Proctology, of which J. Joseph Cronin of Boston is president, will hold its twenty-third Annual Convention at the Cleveland Hotel, Cleveland, April 11-13, 1949.

John Spencer of St. Joseph, Mo., program chairman, announces that the morning sessions will feature a well-balanced schedule of lectures and surgical motion pictures. Clinical sessions will be held afternoons at the new Bay View Hospital.

These conventions are actually concentrated courses in postgraduate proctology. Nonmembers may attend by the payment of a $35.00 registration fee.

Those planning to attend should make reservations at the Cleveland Hotel immediately after March 1.